AD_____

Award Number: W81XWH-05-2-0086

TITLE: Airport, Academia, Industry, Military, State (AAIMS) Consortium to Test Military/Civilian Communications and FDDMTF Deployment for OCONUS Mass Casualties

PRINCIPAL INVESTIGATOR: Colin Mackenzie, M.D.

CONTRACTING ORGANIZATION: University of Maryland
                                             Baltimore, MD 21201

REPORT DATE: October 2006

TYPE OF REPORT: Final

PREPARED FOR: U.S. Army Medical Research and Materiel Command
                         Fort Detrick, Maryland 21702-5012

DISTRIBUTION STATEMENT: Approved for Public Release;
                                          Distribution Unlimited

The views, opinions and/or findings contained in this report are those of the author(s) and should not be construed as an official Department of the Army position, policy or decision unless so designated by other documentation.

REPORT DOCUMENTATION PAGE

1. REPORT DATE	2. REPORT TYPE	3. DATES COVERED
01-10-2006	Final	15 Sep 2005 -14 Sep 2006

4. TITLE AND SUBTITLE

Airport, Academia, Industry, Military, State (AAIMS) Consortium to Test Military/Civilian Communications and FDDMTF Deployment for OCONUS Mass Casualties

5a. CONTRACT NUMBER

5b. GRANT NUMBER
W81XWH-05-2-0086

5c. PROGRAM ELEMENT NUMBER

6. AUTHOR(S)

Colin Mackenzie, M.D.

5d. PROJECT NUMBER

5e. TASK NUMBER

5f. WORK UNIT NUMBER

7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES)

University of Maryland
Baltimore, MD 21201

8. PERFORMING ORGANIZATION REPORT NUMBER

9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES)
U.S. Army Medical Research and Materiel Command
Fort Detrick, Maryland 21702-5012

10. SPONSOR/MONITOR'S ACRONYM(S)

11. SPONSOR/MONITOR'S REPORT NUMBER(S)

12. DISTRIBUTION / AVAILABILITY STATEMENT
Approved for Public Release; Distribution Unlimited

13. SUPPLEMENTARY NOTES
Original contains colored plates: ALL DTIC reproductions will be in black and white.

14. ABSTRACT
Military /Civilian Medical Mutual Agreements are rarely tested but would be needed for outside Continental US (OCONUS) Mass Casualty (MASCAL) events when military bed capacity was exceeded. This AAIMS project trained Civilian and Military emergency response personnel in NDMS and NIMS for MASCAL during 3 Table top Exercises (TTX) and a Functional Exercise (FX) which: a) Tested implementation of Mutual Aid Agreement between WRAMC NDMS and Maryland EMS for MASCAL reception at BWI airport and access to civilian surge capacity bed in NDMS Hospitals, b) Assessed field deployment of the FDDMTF for MASCAL triage, c) Evaluated military/civilian communications, d) Tested the usefulness of wireless video communications in promoting EOC Situational Awareness. AAIMS was the first Maryland NDMS exercises in more than 20 years. Significant levels of military-civilian collaboration were established and Inter Agency cooperation and planning optimized for activation of NDMS. AAIMS facilitated revisions of the Maryland Emergency Operations Plan to Include the NDMS activation plan across all key emergency response State Agencies. Maryland is now set to become the first state to have the NDMS plan incorporated into their Governor's Emergency Operations Plan. The FX After action Report made task specific recommendations and suggested three working groups to implement these recommendations. A future full scale NDMS exercise is planned, centered in Maryland. Task specific recommendations from the AAIMS NDMS FX are shown in Appendix 1.

15. SUBJECT TERMS
AAIMS, MASCAL, TTX, NDMS, NIMS, FDDMTF, FX

16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT	18. NUMBER OF PAGES	19a. NAME OF RESPONSIBLE PERSON USAMRMC
a. REPORT	b. ABSTRACT	c. THIS PAGE			19b. TELEPHONE NUMBER *(include area code)*
U	U	U	UU	141	

Table of Contents

Abstract

Military/Civilian Medical Mutual Agreements are rarely tested but would be needed for outside Continental US (OCONUS) Mass Casualty (MASCAL) events when military bed capacity was exceeded This AAIMS project trained Civilian and Military emergency response personnel in NDMS and NIMS for MASCAL during 3 Table Top Exercises(TTX) and a Functional Exercise(FX) which a) Tested implementation of Mutual Aid Agreement between WRAMC NDMS and Maryland EMS for MASCAL reception at BWI Airport and access to civilian surge capacity bed in NDMS Hospitals, b) Assessed field deployment of the FDDMTF for MASCAL triage, c) Evaluated military/civilian communications d) Tested the usefulness of wireless video communications in promoting EOC Situational Awareness. AAIMS was the first Maryland NDMS exercises in more than 20 years. Significant levels of military- civilian collaboration were established and Inter Agency cooperation and planning optimized for activation of NDMS. AAIMS facilitated revisions of the Maryland Emergency Operations Plan to include the NDMS activation plan across all key emergency response State Agencies. Maryland is now set to become the first state to have the NDMS plan incorporated into their Governor's Emergency Operations Plan. The FX After Action Report made task specific recommendations and suggested three working groups to implement these recommendations. A future full scale NDMS exercise is planned, centered in Maryland. Task specific recommendations from the AAIMS NDMS FX are shown in Appendix 1.

Introduction

Medical mutual aid is the redistribution of personnel, facilities, equipment or supplies to those in need in times of crisis (National Defense Research Institute and Rand Health *Triage for Civil Support – Using Military Medical Assets to Respond to Terrorist Attacks*). Medical mutual aid provides surge capacity and capability that is immediately operational, reliable, and cost effective; but requires coordination of military/civilian physical and personnel resources among several agencies. The purpose of this research was to evaluate military/civilian communications, assess deployment of the Forward Deployable Digital Medical Treatment Facility (FDDMTF), and test implementation of the Mutual Aid Agreement between the Walter Reed Army Medical Center (WRAMC), the National Disaster Medical System (NDMS) and the civilian Maryland Emergency Medical Services System (MIEMSS), to access civilian NDMS hospitals in Maryland to accommodate 'surge capacity' for hospital beds. The Airport, Academia, Industry, Military, State (AAIMS) project was to exercise notification to the Maryland EMS of an outside of the continental U.S. (OCONUS) Mass Casualty (MASCAL) event that required coordination of military/civilian bed surge capacity. In addition, the AAIMS project evaluated whether fixed and mobile video images could improve Emergency Operation Center (EOC) situational awareness.

This Final Report is presented with the After Action Report from the first Table Top Exercise (TTX 1) (Task 3) and the After Action Report from the Functional Exercise (FX) (Task 6) as the primary deliverables. The recommendations and improvement actions needed for a future large scale NDMS activation exercise are shown in Appendix 1.

The Final Report recognizes the important input into earlier drafts of the After Action Reports for TTX 1 and the FX by members of the AAIMS planning group. Particular mention should be made for the valuable input from John Donohue (MIEMSS), LTC Philip Wasylina (WRAMC-NDMS), George Mitchell (MEMA), and Chief 'Woody' Cullum and colleagues from BWI Fire and Rescue.

Executive Summaries

Executive Summary of TTX 1 (Statement of Work: Task 3)

This executive summary reports on the Airport, Academia, Industry, Military, State (AAIMS) Consortium Table Top Exercise (TTX), a one-day exercise held on Tuesday, July 12, 2005 in preparation for a functional exercise in May 2006. The exercise was co-sponsored by: The National Study Center for Trauma and EMS, the Maryland Institute for Emergency Medical Services Systems (MIEMSS) and the Maryland Emergency Management Agency (MEMA)

The TTX applied incident command structure and resources for Mass Casualty (MASCAL) reception, activation of the National Disaster Management System (NDMS) reception plan, and exercising of the Mutual Aid Agreement between Walter Reed Army Medical Center (WRAMC) and MIEMSS to access civilian surge capacity beds.

The TTX provided an excellent introduction to NDMS and face to face interactions with military partners for participants who had little or no previous experience in NDMS activation. The TTX identified several weaknesses in coordination among the agencies, personnel and facilities responding to the MASCAL scenario. In a real event these shortcomings could have seriously impaired the expeditious emergency management and distribution of military casualties to civilian hospital surge capacity.

Ten recommendations were made in response to five major findings (see summary findings on pages 10 to 12 from the evaluations of the TTX) and from self evaluations by the participants. The recommendations included review of existing NDMS MOU's, increased training and NDMS exercises, development of operational protocols for MASCAL reception, triage, transportation and staging. It was further recommended that military and civilian NDMS partners should meet to establish the NDMS reception plan, both for military casualty access to civilian hospitals and vice versa. NDMS hospitals should have a reception team and performance measures for timely acceptance of MASCAL, and they should exercise their individual Emergency Operation Centers. NDMS hospitals should jointly develop procedures for common tasks related to NDMS activation, sharing of resources and assets for likely MASCAL scenarios. Maryland NDMS should have a medical reception team responsive in less than twelve hours. Communication capability should be enhanced between NDMS hospitals and a single state agency and all TTX participants should be trained in command and control structure and communication procedures. Future NDMS TTX should include organizational and exercise control changes to improve information flow and learning.

Executive Summary of FX (Statement of Work: Task 6)

The exercise was co-sponsored by: The National Study Center for Trauma and EMS, the Maryland Institute for Emergency Medical Services Systems (MIEMSS), Walter Reed Army Medical Center (WRAMC/NDMS) and the Maryland Emergency Management Agency (MEMA).

The FX applied National Incident Management System (NIMS) Incident Command Structure (ICS) and resources for Mass Casualty (MASCAL) reception, activation of the National Disaster Management System (NDMS) reception plan, and exercising of the revised Mutual Aid Agreement between Walter Reed Army Medical Center (WRAMC) and MIEMSS to access civilian surge capacity beds through the MOA with BWI Fire and Rescue.

The FX provided a test of the excellent face to face interactions with military partners during the prior 12 months of planning and an introduction to field application of NIMS, ICS, NDMS and MASCAL reception for participants who had little or no previous experience in NDMS activation. The FX identified several issues that in a real event could have affected the expeditious emergency management and distribution of military casualties to civilian hospital surge capacity.

Key Overall Achievements AAIMS/NDMS
1. First Maryland National Disaster Medical System (NDMS) exercises in more than 20 years.
2. Established significant levels of military- civilian collaboration during more than 20 two hour long meetings.
3. Optimized State Inter Agency cooperation and planning for activation of NDMS in response to natural or man-made mass casualty incidents either in the U.S. or abroad.
4. Exercised the NDMS and National Incident Management System (NIMS) and Incident Command System (ICS) with multiple state agencies and military medical systems (including VAMS) participation and involvement of the majority of civilian NDMS hospitals in Maryland.
5. Facilitated revisions of the Maryland Emergency Operations Plan to include the NDMS activation plan across all key emergency response State Agencies.
6. As a result of the AAIMS/NDMS collaboration and interagency, civilian and military cooperation, Maryland is set to become the first state to have the NDMS plan incorporated into their Governor's Emergency Operations Plan.

7. Baltimore – Washington Thurgood Marshall International Airport (BWI) has established and exercised procedures for use of a specific site on the airfield to conduct reception and triage of multiple patients and allow transportation to NDMS hospitals that can be activated without impeding normal civilian activities for this busy international airport.

The task specific recommendations and actions needed resulting from the AAIMS Consortium NDMS FX of May 20th, 2006 are shown in Appendix 1.

Body

Statement of Work Tasks:

Task 1: Organize planning meetings between AAIMS Consortium members to train Emergency Management Responders in the Consortium Agencies and in Local and Regional hospitals in NIMS and NDMS template methodologies.

Task 2: Convene a Table Top Exercise (TTX) of AAIMS Consortium members to apply National Incident Management System (NIMS) and NDMS methodologies in responding to Mass Casualties (MASCAL) arriving at Baltimore Washington International Thurgood Marshall Airport from an OCONUS event, and to allow transport and distribution to civilian NDMS hospital surge capacity beds in Maryland.

Task 3: Prepare an After Action Report of the TTX and incorporate the recommendations into the planning process for a Functional Command and Control Exercise with the AAIMS Consortium partners.

Task 4: Conduct a Functional Command and Control Exercise (FX) in conjunction with deployment of the FDDMTF from Ft. Detrick to Baltimore Washington International Thurgood Marshall Airport. Evaluate communications between AAIMS Consortium participants to access surge capacity bed and personnel status in local and regional NDMS hospitals.

Task 5: Assess remote tele-triage and audio-video communications between the field exercise and Emergency Operations Centers (EOCs), and complete a report on the expert opinion of the utility of remote tele-triage.

Task 6: Prepare an After Action Report (AAR) on the Functional Exercise (FX) and a Final Report on the AAIMS Consortium activities.

Aerial view of Functional Exercise (FX) set-up

9

Accomplishments for each Statement of Work Task:

TASK 1:

NDMS training was carried out for more than 120 EMS/Military personnel. Additionally, through a series of more than 20 two hour-long meetings, significant levels of military-civilian collaboration were established.

TASK 2:

A total of three TTXs were performed in this project. These were the first Maryland NDMS exercises in more than 20 yrs.

The first one-day TTX (TTX 1) was held on July 12, 2005. The TTX applied incident command structure and resources for Mass Casualty (MASCAL) reception, activation of the National Disaster Medical System (NDMS) reception plan, and exercising of the Mutual Aid Agreement between Walter Reed Army Medical Center (WRAMC) and MIEMSS to access civilian surge capacity beds.

TTX 1 provided an excellent introduction to NDMS and face to face interactions with military partners for participants who had little or no previous experience in NDMS activation. It also identified several weaknesses in coordination among the agencies, personnel and facilities responding to the MASCAL scenario. In a real event these shortcomings could have seriously impaired the expeditious emergency management and distribution of military casualties to civilian hospital surge capacity. Ten recommendations were made in response to five major findings, in an effort to improve the response to the future FX.

The second one-day TTX (TTX 2) was performed on February 21, 2006. The goals of the exercise were to test and evaluate the revised NDMS activation plan and MOU jointly developed by MIEMSS/WRAMC & BWI Fire and Rescue; apply the NIMS ICS principles to evaluate communication information resources for CONUS reception of mass casualties; and test the process of activation of the NDMS using voice, data, and other information management systems. Improvements from the first TTX were seen, and four recommendations were made from five findings from TTX 2.

The third TTX (TTX 3) was an information session involving only NDMS hospitals in Maryland, at which an overview of the NDMS plan and of NDMS patient flow and accountability was presented.

TASK 3:

After Action Report—TTX 1

Finding 1: Activation of NDMS in Maryland has never occurred (the only other exercise was in the 1980's) so that most of the TTX participants had no experience of NDMS response or in interacting with the U.S. Military, our partners in the TTX.

Recommendation 1a

The NDMS operational plan of state agencies should be reviewed and the Memorandum of Understanding (MOU) among all state agencies standardized and updated.

Recommendation 1b

> The State, County and Local emergency response personnel should be regularly trained and exercised on the NDMS plan.

Recommendation 1c

> Operational protocols are required that identify procedures for mass casualty reception, triage, transportation and staging.
>
> - Conformity between civilian and military NDMS procedures for reception, treatment, on scene command, transportation/staging
> - Standardized public information statements for official use
> - Identification of airport exit routes to NDMS hospitals recommended access

Finding 2: There was a lack of understanding of the Mutual Aid Agreement and the Incident Action Plan between military and civilian Emergency Management personnel and agencies.

Recommendation 2a

> For military contingency operations, NDMS partners should establish which parts of the Mass Casualty reception the military controls, and the procedures and situations in which sharing with civilian authorities will occur. Conversely, procedures for civilian mass casualties accessing military hospital bed surge capacity should be developed.
>
> - Federal, military, state, local, industry, healthcare, and academia NDMS partners should meet to improve their mutual role understanding for NDMS activation, unified command performance and information flow.
> - NDMS Incident Command training is required to improve liaison with functional response units and promote situational awareness among the civilian and military NDMS responders.

Finding 3: NDMS Hospitals have no plan for receiving the MOU agreed upon number of casualties within a finite time window.

Recommendation 3a

> NDMS Hospitals should have a reception team and should define performance measures for admission of their designated number of NDMS Mass casualties.

Recommendation 3b

> Each NDMS Hospital should regularly exercise their Emergency Operation Centers, activate and evaluate the NDMS plans to open military and civilian liaisons, find NDMS beds, and transport and practice preparations to receive mass casualties.

11

Recommendation 3c

NDMS hospitals should jointly develop procedures for common tasks related to NDMS activation, and determine resource and asset sharing for likely "what if" NDMS scenarios.

Recommendation 3d

The Maryland NDMS should have a "medical reception team" that can respond in less than 12 hours for mass casualty triage, treatment, transport and to take on Incident Command responsibilities.

Finding 4: Communication failures between the Incident Site and both military and civilian, city and state agencies and hospitals, prevented NDMS partners from receiving accurate and timely notice of NDMS mass casualty status and transports, to prepare for their coordinated response.

Recommendation 4a

There should be duplex voice, data and image communication capabilities between NDMS hospitals, and unified command patched through a single state agency.

Recommendation 4b

All exercise participants should be trained in medical management, command and control structure and communication procedures.

- Improve coordination and liaison between Military, Airport and MIEMSS
- Refine and communicate policies and procedures for NDMS Reception Center
- Unified Command should brief all sections, and develop and communicate the Incident Action Plan.

The Functional exercise in May 2006 should test specific improvements instituted as a result of this exercise and should include a focus on establishing Incident Command, communications between all agencies and public information measures.

Finding 5: Future TTX need organizational changes:

- All participants in a single room to improve information flow
- Easier access to computers/Web EOC
- Tighter control of TTX by exercise controllers/facilitators
- Mentoring by NDMS expert during TTX
- 100 patients were insufficient to "stress" the NDMS system

After Action Report—TTX 2

Summary Findings & Recommendations:

A. Mission Execution

Finding 1: Each entity understood their roles in relation to the incident at hand. Command and control was quickly established with minimal disruption. Requisite reporting procedures were followed according to established guidelines, and memorandums of understanding were immediately implemented.

Recommendation 1

Continue to update and exercise activation plans and cooperative agreements established by state and local agencies

B. Policies and Operating Procedures

Finding 2: All participants were intimately familiar with their organization's standard operating procedures with respect to disaster preparedness. Bed status reporting, along with logistics requirements, were communicated to the Incident Command Structure (ICS). The identification of local resources and admission policies was applied to the exercise play.

Recommendation 2

None

C. On-site Coordination

Finding 3: During a MASCAL event, the incident site will be the most challenging area. Logistics coordination, along with identifying assets, interaction with the media and various levels of command and control issues will enhance the confusion. Security measures will also require constant vigilance as the MASCAL event is at a busy commercial International Airport.

Recommendation 3

Ensure the Incident Command Structure is established immediately and is staffed with the requisite personnel representing the organizations responsible for supporting the incident site. Review policies and procedures to determine if all aspects in relation to supporting the incident site are covered i.e. Public Information Officers (PIO), graves registration, escort issues, security, triage, and identification of assets.

D. Military Support

Finding 4: Activation of NDMS is under the auspices of the Walter Reed Army Medical Center; however, the use of these assets along with other Department of Defense (DoD) units requires an execution authorization from the Military Command Authority and/or a mission request number.

Recommendation 4

Ensure standard operating procedures outline chain of command procedures and points of contact for possible use of electronic means (i.e. voice, fax, email) which may facilitate receipt of mission orders.

E. Communications Compatibility

Finding 5: One aspect of the TTX which was not fully realized was that of the communications requirements with respect to the various coordinating organizations and their communications equipment. It's assumed that the local hospitals along with its corresponding emergency medical services transmit on the same frequencies, however, how will communications be handled with the military units operating in support? What will be the primary source for communicating—land lines, cell phones, or satellite phones, and where will these efforts be located? Also, are these devices approved for use in an airport flight zone of operation?

Recommendation 5

As part of activation plans and MOU development, participating NDMS agencies should provide a list of approved communications devices and frequencies that will be used to support an incident.

TASK 4:

On May 20, 2006, in a field Functional Exercise (FX), the Airport, Academia, Industry, Military, State (AAIMS) Consortium members used new video technology to test the revised National Defense Medical System (NDMS) plan of response to mass military casualty reception.

The FX applied National Incident Management System (NIMS) Incident Command Structure (ICS) and resources for Mass Casualty (MASCAL) reception, activation of the NDMS reception plan, and exercising of the revised Mutual Aid Agreement between Walter Reed Army Medical Center (WRAMC) and the Maryland Institute for Emergency Medical Services Systems (MIEMSS), to access civilian surge capacity beds through the MOA with BWI Fire and Rescue.

During the FX, patients arrived en masse by a C-130 aircraft to a designated location at the BWI airport, were triaged and stabilized while still in the aircraft or after transport to the DECON or triage tents, were then transported to the appropriate hospital, and finally the hospital was contacted to confirm patient receipt. The activities of the day were recorded using a real-time video capture and distribution system (VCDS) and relayed to an incident command (IC) site.

The FX provided a field test of the excellent face to face interactions with military partners during the prior 12 months of planning, and an introduction to field application of NIMS, ICS, NDMS and MASCAL reception, for participants who had little or no previous experience in NDMS activation. Use of the VCDS enabled IC site staff to track the triage status of patients and other developments of the FX. The exercise also identified some weaknesses in the current response to MASCAL reception, based upon which 21 recommendations were made to the appropriate agencies to improve the current NDMS activation plan.

The achievements of the FX include that it was part of the first Maryland National Disaster Medical System (NDMS) exercises in more than 20 years, and that it established

significant levels of military- civilian collaboration during more than 20 two hour long meetings. State Inter Agency cooperation and planning for activation of NDMS in response to natural or man-made mass casualty (MASCAL) incidents either in the U.S. (CONUS) or outside of the U.S. (OCONUS) was optimized. The FX exercised the NDMS and National Incident Management System (NIMS) and Incident Command System (ICS) with multiple state agencies and military medical systems (including VAMS) participation and with involvement of the majority of civilian NDMS hospitals in Maryland. The exercise facilitated revisions of the Maryland Emergency Operations Plan to include the NDMS activation plan across all key emergency response State Agencies. As a result of the AAIMS/NDMS collaboration and interagency civilian and military cooperation, Maryland is set to become the first state to have the NDMS plan incorporated into its Governor's Emergency Operations Plan. Additionally, the Baltimore Washington Thurgood Marshall International Airport (BWIA) has established and exercised procedures for use of a specific site on the airfield to conduct reception and triage of MASCAL and allow transportation to NDMS hospitals that can be activated without impeding normal civilian activities for this busy international airport.

TASK 5:

A major challenge for disaster management is real-time situational awareness. Timely and reliable aggregate data is necessary for resource assessment and planning. New technology allows for information gathering and collaboration across information networks that would be of benefit to emergency response. We evaluated the utility of multiple fixed and mobile video image displays in increasing situational awareness in EOCs during the aforementioned NDMS FX.

The Video Capture and Distribution System (VCDS) consisted of 16 video cameras connected with a digital video recorder (DVR) and a DVR viewer for real-time display of the 16 video images, and a wireless relay station for the remote viewing station at the EOC. The VCDS-DVR could be configured at a rate of 1, 2, 4, 8, 15, 30 frames per second per video feed. The viewer providing from 1 to 16 images per screen, was projected onto an 8 foot by 6 foot display in the EOC. Six experts (three physicians, one military, and two EMS personnel) completed image evaluations scoring them on a 1-5 (worst to best) Likhert Scale. During the FX the cameras were strategically focused on all aspects of the FX, including MASCAL reception, triage tents, staging and transportation. VCDS captured 16 images per second for all 16 video feeds and displayed 4, 9 or 16 images at the remote EOC. A total of 2 hours and 10 minutes of real-time video (130 min*60 sec per min*1 image per channel*16 videos = 124800 images) were captured. End-to end delay was less than 4 seconds, mainly due to the wireless transfer.

Video imagery from mobile devices covering the entire FX site and from fixed locations improved EOC situational awareness. The developments in the FX could be tracked, and the triage status of MASCAL could be immediately determined. The images also provided a useful training and debriefing record of the FX. It was found that imaging networks and technical support for EOCs and Incident Command Posts are needed to support both, planned coordination of EOC image access from Emergency Response sites by various approved agencies, and a mechanism to support this action where prior planning is not feasible or additional entities need access.

A challenge we ran into was that firewalls around the EOC could not be opened because of administrative barriers, and thus wireless (slower) transmission was used.

TASK 6:

The three TTXs and one FX that were performed have optimized state interagency cooperation and planning for activation of NDMS in response to natural or man-made mass casualty (MASCAL) incidents either in the continental U.S. (CONUS) or outside of the continental U.S. (OCONUS). The exercises have facilitated revisions of the Maryland Emergency Operations Plan to include the NDMS activation plan across all key emergency response state agencies.

Task specific recommendations and actions were made in the After Action Report for the FX (see summary in Appendix 1). It was further recommended that three working groups (WG 1-3) be activated: WG1:-To ensure 100% compliance with triage tags, patient accountability and return of equipment used in MASCAL events and exercises.WG2:-To make available Information technology, imaging networks and technical support for NDMS MASCAL, for EOC's and Incident Command Posts. WG2 will determine both a mechanism to support a planned coordination of access by various approved agencies and a mechanism to support this action where prior planning is not feasible or additional entities need access. WG3:- To establish a Training, Education and Evaluation working group to recommend training, education, and development of evaluation data collection instruments in conjunction with the exercise planning group.

As a result of the AAIMS/NDMS collaboration and interagency civilian and military cooperation, Maryland is set to become the first state to have the NDMS plan incorporated into its Governor's Emergency Operations Plan. Also through this effort, the Baltimore-Washington International Thurgood Marshall Airport has established and exercised procedures for use of a specific site on the airfield to conduct reception and triage of MASCAL and allow transportation to NDMS hospitals, which can be activated without impeding normal civilian activities for this busy international airport.

<u>After Action Report—FX</u>

Summary Exercise Findings by Task:

TASK 1. Exercise Planning, Coordination and Evaluation
Conduct the exercise in concert with the DHS Homeland Security Exercise and Evaluation Program (HSEEP). Methodically plan the events and scenario based on the objectives and desired outcomes. Evaluation should be objective and aimed at judging the success of the exercise as a measure of achievement of the stated objectives.

Observations
- Designate evaluation lead (and committee)
- Provide opportunity to recruit subject matter experts

- Train and develop data collection instruments in conjunction with planning committee
- Instruments should follow HSEEP protocol

Recommendations

1.1   Training and Education should occur among NDMS participants: Joint training opportunities should be conducted on key topics such as ICS basics, civilian/military terminology and nomenclature, COP (Common Operating Picture).

1.2   Establish a joint training team to conduct educational opportunities, Certifications and equipment familiarity

1.3   Establish a Training, Education and Evaluation Working Group that would recommend training, education and development of evaluation data collection instruments (following HSEEP protocols) and recruit subject matter experts in conjunction and in parallel with the Planning Committee for future NDMS Exercises.

Task 2 Communication
Effectively communicate information about each patient and for coordination of activities

Observations
- No communication with the Command Post
- Red Tent personnel confused about what was going on
- Red Tent had no way of communicating with other tents ()
- Difficulty sorting out various radio frequencies
- EMS unaware that patients in the OASIS tent were ready for transport(UMMC patients waiting on floor of OASIS ~ entire exercise)
- Scenario confusion (HAZMAT team were told they were receiving hurricane patients with exposure to fecal matter)
- Triage nomenclature, terminology different use by civilian and military
- Radios: Better coordination is required to identify various agencies radio and frequency capabilities and limitations.
- Networking/Automation: Prior coordination for Network administrators to support various disaster agencies. Develop mechanism to support this action where prior planning is not feasible.
- EMS could not get information that FDDMTF patients were ready for transport

Recommendations

2.1   The ICS Communications plan (ICS Form 205) should be completed to define radio type, frequencies and interoperability and to whom (Role) each of these radios is allocated. This should be disseminated with the Incident briefing (ICS201),

organizational chart (ICS207) and incident maps (ICS 202)

2.2 Inter Operability of communications between military and civilian entities is essential and should be immediately obtained e.g., by technology or sharing of a common radio frequency.

2.3 Personnel in the triage tents must be able to communicate with the Incident Command Post, each other, and with Staging , Transport and NDMS receiving Hospitals.

2.4 Information technology, imaging networks and technical support should be made available for EOC's and Incident Command Posts by preplanning system architecture to support disasters. The recommendation includes establishment of a Working Group (WG2) to determine both a mechanism to support a planned coordination of access by various approved agencies and a mechanism to support this action where prior planning is not feasible or additional entities need access.

Task 3 - Patient Triage & Treatment

Working with medical attendants on the aircraft, quickly remove the patients and transport them to the Triage group location for cursory evaluations and sorting to treatment areas. Three methods of removing patients and transporting them to the Triage Group. (Hand Carry, Ambulance, Bus) Time motion studies are to be conducted to evaluate the most efficient means.

Observations
- Took 30 min. to take 12 patients off plane
- Information in medical records were inadequate
- No triage tags or improper tagging
- Tagging was done on plane as well as in triage tents
- Medical record for dog in cage
- Patient administrator (PAD) & triage person need to coordinate to avoid reduplication of effort
- One patient not accounted for
- OASIS provide excellent care and treatment of patients (2 min per pt)
- Contaminated patients improperly deplaned
- No hazard evaluation of plane prior to approach
- There were no medical personnel traveling on the aircraft with the patients
- Patients should have tags

Recommendations
3.1 For NDMS Patients arriving at BWI, the patients/casualties should be immediately de-planed, then triaged, tagged, and treated with coordination of activities between the Patient Administrator (PAD) and Triage personnel.

3.2 From information gathered from video documentation, conduct time/motion studies and consider with patient/provider safety to determine safest/most efficient method to move patients.

Task 4 - Patient Transportation and Tracking

Upon stabilization , transport patients to designated facilities as planned by the State EMS Medical Director and Chief Military Medical Authority and adequately track the transporting units, destination and assigned medical care devices for later follow-up or retrieval

Observations

- Patient Gurney Civilian v. litter (military stretcher) Small wheels v. big wheels.
- Litters/Backboards: Joint civilian/military familiarization training needs to occur. Military Litters do not fit into civilian ambulances. Both parties need training.
- PMI Accountability: Patient Movement Items need to be tracked. There is usually an inverse relationship built over more patients to less equipment accountability and hence availability. Establish a working group to solve this issue.

Recommendations

a. Joint civilian/military familiarization training is recommended to transfer patients from military litters, that do not fit into civilian ambulances. Additional purchases of litter backboards and stretcher innovations should be considered to facilitate this transfer and allow faster movement of patients.

b. Triage tagging, Patient Movement Item (PMI) and Equipment tracking and accountability should be improved to ensure 100% compliance with Triage tags,100% PMI accountability and 100% return of equipment used in MASCAL to source of distribution. This recommendation includes establishment of a Working Group(WG1) to solve these issues.

Task 5 Command Post

Establish a command post with adequate resources to be able to conduct operations over an extended period

Observations

- Too many people made it difficult to hear and or keep up with information flow
- Video was useful
- Minimal technical support available
- Provide name plates
- Headsets to minimize noise

Recommendations

5.1 The new NIMS Organizational Chart developed for the exercise should be backed-up by a standard operating guideline (SOG) for the positions identified. This guideline should briefly identify the position's responsibility.

5.2   The NIMS Chart, SOG and IAP should be incorporated into one document to provide guidance for future tabletops, field exercises or actual events.

5.3   Incident Command should receive real-time information from BWI flight control (as was done in July 2006 for the repatriation of over 3,000 evacuees from Lebanon).

Task 6 - Decontamination

Although it is unlikely that there would be any contaminated patients loaded on the aircraft, crews were to decontaminate one patient to determine how the contingency would affect the flow of operations

Observations

- Have additional fuel on hand for the water heater
- Consider a bladder for larger operations
- Funding for full gear in order to receive full training value from exercises
- Better communication regarding scenario in order to plan appropriate response
- Use another EMS team for medical surveillance to ensure safety
- PPE should be standardized
- Stretchers should be used to transport patients to decontamination tent
- Remove contaminated clothing to protect medical personnel

Recommendations

6.1   BWI Fire and Rescue Service should have Decontamination (DECON) and Isolation facilities and the resources to provide PPE and training to manage decontamination of large numbers of patients

Task 7 FDDMTF

Erect and test the utility of the Forward Deployable Digital Medical Treatment Facility (FDDMTF)

Observations

- Should establish isolation tent for patients with amputation
- FDDMTF functioned well and triage was efficient, the FDDMTF asset was invaluable for MASCAL reception
- Civilian EMS could use FDDMTF when other resources were unavailable

Recommendations

7.1   Establish the correct procedures and approval process for civilian MASCAL use of FDDMTF

Task 8 - Veterinarian

As with decontamination, NDMS reception should not include animals. In order to investigate the impact of this contingency one "dog" was included in the patient list and veterinarians and representatives from the Department of Agriculture were to evaluate the patient and make arrangements for disposition

Observations
- List of veterinary hospitals needed in vicinity of BWI
- List of military veterinary hospitals
- List of supplies needed to transport animals to hospitals
- List of animal transporters to move animals from BWI to respective vet hospitals in quarantined facilities
- List of medical veterinary equipment needed
- Designated animal exercise area at BWI

Recommendations

8.1   There should be a listing of veterinary hospitals in vicinity of BWI and of military veterinary hospitals with contact information.

8.2   There should be supplies, equipment and transport to move animals from BWI to respective vet hospitals in quarantined facilities.

8.3   Designated animal exercise areas are needed at BWI.

Task 9 - Assure Safety

Ensure that all exercise participants, observers, and evaluators can complete their tasks in a environment free from the risk of injury. Adequately monitor the activities and personnel to prevent an action that could be deemed unsafe.

Observations
- Red, Yellow and Green tents not staked down adequately for wind
- Patients not properly secured to backboards
- Triage of patient potential "real life" problem
- No gloves in tent for triage personnel
- Personnel Accountability Report (PAR): We need to do a better job of incorporating PAR into our exercises.
- No one available to "spot" ambulances while backing up
- Disposable ear plugs for all participants
- Provide hearing protection for safety of participants
- Secure tents for potentially windy conditions
- Hazard evaluation should occur prior to off-loading

Recommendations
9.1   Safety specialists should be gathered to re-evaluate all the hazards of operating within the confines of an active airfield and develop a safety plan for future exercises or operations.

Task 10 - Supplies & Equipment
Provide for adequate equipment, shelter and supplies to care for the expected number of patients and providers

Observations
- Tents: BWIFRS should receive additional triage tents to support contingency operations outside of normal response stock.
- Soft goods/Class VIII Medical Supplies: There needs to be an on-scene medical supply cache necessary to support first responder and initial re-supply that is house in ready deployable plastic containers.

Recommendation
10.1   BWI Fire and Rescue Service should obtain additional Triage tents that are more substantial than those used in the exercise, modeled on the FDDMTF, that can be adequately staked down and have protection in austere conditions.
10.2   A Soft Goods/ Class VIII Medical Supplies Cache should be on-scene, housed in readily deployable plastic containers at the triage site to support first- responders and provide initial re-supply

Task 11 - Reception at NDMS Hospital
Transport the patients to 4 hospitals and make initial contact with the hospitals to confirm receipt of specific patients and begin to establish individual care plans

Observations
- Difficulty with Army bus off-loading and unfamiliar with Army litters at civilian hospitals
- No contact was made with the hospitals to arrange the monitoring of care
- All exercise activity was halted before the contact could be made to the hospitals.

Recommendations
11.1   Prepare a patient follow-up plan with input form the hospitals and WRAMC FCC, educate all involved personnel and design next exercise to ensure that patient follow-up does not get negated.

Task12 - Media and VIPs

Observations

- Develop protocol for working with group to keep from impeding exercise flow
- To avoid confusion , during an exercise , information should be disseminated through the same agencies that would be the lead PIO in the 'real-world' incident
- Difficult to access the patient due to photographers and VIPs

Recommendation

12.1   Gather the associated PIOs to review and familiarize themselves with the current Media Plan for BWI and research the best method to allow media additional access during an exercise without interference with exercise flow.

Key Research Accomplishments

- First Maryland National Disaster Medical System (NDMS) exercises in more than 20 years
- Established significant levels of military-civilian collaboration during more than 20 two-hour long meetings
- Optimized State Inter-agency cooperation and planning for activation of NDMS in response to natural or man-made mass casualty (MASCAL) incidents either in the continental U.S. (CONUS) or outside of the continental U.S. (OCONUS)
- Exercised the NDMS and National Incident Management System (NIMS) and Incident Command System (ICS) with multiple state agencies and military medical systems (including VAMS) with participation and involvement of the majority of civilian NDMS hospitals in Maryland.
- Facilitated revisions of the Maryland Emergency Operations Plan to include the NDMS activation plan across all key emergency response State Agencies
- As a result of the AAIMS/NDMS collaboration and interagency civilian and military cooperation, Maryland is set to become the first state to have the NDMS plan incorporated into its Governor's Emergency Operations Plan.
- Baltimore – Washington International Thurgood Marshall Airport has established and exercised procedures for use of a specific site on the airfield to conduct reception and triage of MASCAL and allow transportation to NDMS hospitals, that can be activated without impeding normal civilian activities for this busy international airport.
- Twenty-one recommendations were made and three working groups (WG 1-3) were suggested to implement these recommendations: WG1: To ensure 100% compliance with triage tags, patient accountability and return of equipment used in MASCAL events and exercises. WG2: To establish methods to make available information technology, imaging networks and technical support for NDMS MASCAL, for EOCs and Incident Command Posts. WG2 will determine both a mechanism to support a planned coordination of access by various approved agencies and a mechanism to support this action where prior planning is not feasible or additional entities need access. WG3: To establish a Training, Education and Evaluation working group to recommend training, education, and development of evaluation data collection instruments in conjunction with future large scale exercise planning groups.

Reportable Outcomes*

1. Hu PF, Gagliano DM, Tang N, Truong LV, Markins L, Mackenzie CF. Mobile Wireless Video Transfer Systems (MWVTS) for Disaster Management. 2nd Annual Emergency Preparedness Conference, Washington D.C. Oct 2006.

2. Hu P, Truong L, Seebode S, Tang N. Fixed and Mobile Video for MASCAL reception and EOC awareness. 2nd Annual Emergency Preparedness Conference, Washington D.C. Oct 2006.

3. Hu P, Seebode S, Ho D, Mackenzie CF, Story T, Gilbert G, Handley C, Xiao Y. Rapid deployable Video Capture and Distribution System (VCDS) for real-time disaster management. American Telemedicine Association. In Press. Accepted for Publication 2007.

4. Ho D, Hu P, Seebode S, Mackenzie CF, Brooks T, Handley C, Hirshon JM, Wasylina P, Johnson S. Real-Time Video Review: Data Collection Techniques to Support Situation Awareness. American Telemedicine Association. In Press. Accepted for Publication 2007.

5. Mackenzie C, Hu P, Fausboll C, Nerlich M, Benner T, Gagliano D, Whitlock W, Lam D, Xiao Y. Challenges to Remote Emergency Decision-Making for Disasters or Homeland Security. Cognition, Technology & Work. In Press. Accepted for Publication 2007.

*See Appendix 12 for complete publications

Conclusions

The Table Top (TTX) and Functional (FX) exercises performed for this research have allowed for a better understanding of the current state of military/civilian communications. The exercises tested the interoperability of communications between the civilian and military partners by evaluating the deployment of the Forward Digital Deployment Medical Treatment Facility (FDDMTF) as a triage platform for mass casualties. Communications were evaluated during access to civilian surge capacity, and during wireless transfer of video from the field FX operations to the remote emergency operations center (EOC), and by testing the implementation of the Medical Mutual Aid Agreement between the Walter Reed Army Medical Center (WRAMC) and the Maryland EMS. The FX field tested MASCAL reception in the continental U.S. (CONUS) and civilian bed surge capacity access by transporting MASCAL to Maryland NDMS hospitals. Recommendations made from the results of the first TTX were used to improve the planning of the second TTX and the FX. TTX 1 was attended by over 100 individuals, including representatives from 25 of the 37 National Disaster Medical System (NDMS) hospitals in Maryland. The third TTX involved only NDMS hospitals.

The exercises allowed for identification of strengths and weaknesses in coordinating deployment of the FDDMTF and enabling remote triage and tele-links to Emergency Operations Centers. From the findings of the field FX, recommendations and actions, expected to improve response to MASCAL reception, were made to the appropriate agencies. Three working groups (WG 1-3) were also suggested to implement these recommendations (see Appendix 1).

In the FX, in addition to assessing the deployment of the FDDMTF, we evaluated the utility of fixed and mobile video images on remote Emergency Operations Center (EOC) situational awareness. Developments in the FX could be tracked and the triage status of MASCAL could be immediately determined from the video imagery from the fixed and mobile cameras, thus improving EOC situational awareness.

Through the course of this project we have held more than 20 inter-agency meetings of the Airport, Academia, Industry, Military and State (AAIMS)/ NDMS Consortium. These meetings have enabled the establishment of significant military-civilian collaboration. Since activation of NDMS in Maryland has never occurred, and the only other exercise was in the 1980s, most of the exercise participants had no experience of NDMS response or in interacting with the U.S. Military, our partners in the TTXs. NDMS training was carried out for more than 120 EMS/Military personnel during the course of this research.

This research has optimized state inter-agency cooperation and planning for activation of NDMS in response to natural or man-made MASCAL incidents either CONUS or OCONUS. It has also facilitated revisions of the Maryland Emergency Operations Plan to include the NDMS activation plan across all key emergency response state agencies. The Baltimore-Washington International Thurgood Marshall Airport (BWIA) has established and exercised procedures for use of a specific site on the airfield

to conduct reception and triage of MASCAL and allow transportation to NDMS hospitals, which can be activated without impeding normal civilian activities at this busy international airport. Additionally, as a result of the AAIMS/NDMS collaboration and inter-agency civilian and military cooperation, Maryland is set to become the first state to have the NDMS plan incorporated into its Governor's Emergency Operations Plan. The AAIMS Consortium funding has provided the preliminary plans and recommendations necessary to conduct a future full scale NDMS exercise centered in Maryland. Appendix 1 (pp 28-33) outlines task specific recommendations and actions resulting from the AAIMS NDMS After Action Report that would be helpful for a future full scale NDMS exercise.

Appendix 1: Task Specific Recommendations and Actions Needed Resulting from the AAIMS Consortium NDMS Exercise of May 20, 2006

Task	Recommendation	Improvement Action	Responsible Person / Organization	Completion Date
TASK 1. Exercise Planning, Coordination and Evaluation	1.1 Training and Education should occur among NDMS participants: Joint training opportunities should be conducted on key topics such as ICS basics, civilian/military terminology and nomenclature, COP (Common Operating Picture).	1.1.1 Determine courses that would be helpful		
		1.1.2 Establish regular schedule of classes		
		1.1.3 Assign personnel to classes so that disciplines are mixed for each class		
	1.2 Establish a joint training team to conduct educational opportunities, Certifications and equipment familiarity	1.2.1 Determine what equipment is not common to both disciplines		
		1.2.2 Prepare familiarization curricula and training aids		
		1.2.3 Conduct familiarization sessions during classes in 1.1.2		
	1.3 Establish a Training, Education and Evaluation Working Group that would recommend training, education and development of evaluation data collection instruments (following HSEEP protocols) and recruit subject matter experts in conjunction and in parallel with the Planning	1.3.1 Determine which classes would be appropriate		
		1.3.2 Establish a cadre of personnel that would be available for evaluation		
		1.3.3 Follow HSEEP Planning process from the beginning of planning for next exercises.		
		1.3.4 Establish an evaluation committee for future exercises		

Appendix 1: Task Specific Recommendations and Actions Needed Resulting from the AAIMS Consortium NDMS Exercise of May 20, 2006

Task	Recommendation	Action
Task 2 Communication	2.1 The ICS Communications plan (ICS Form 205) should be completed to define radio type, frequencies and interoperability and to whom (Role) each of these radios is allocated. This should be disseminated with the Incident briefing (ICS201), organizational chart (ICS207) and incident maps (ICS 202)	2.1.1 Catalog frequencies of all agencies that may be involved in an exercise or Operation 2.1.2 Complete ICS 205 2.1.3 Review/Revise ICS 201, 202, and 207 2.1.4 Prepare individual Job Action Sheets for each position which includes reporting lines and operating frequencies
	2.2 Inter Operability of communications between military and civilian entities is essential and should be immediately obtained e.g., by technology or sharing of a common radio frequency.	2.2.1 With information gathered in 2.1.1 determine the most efficient means to distribute / link frequencies for optimum performance
	2.3 Personnel in the triage tents must be able to communicate with the Incident Command Post, each other, and with Staging , Transport and NDMS receiving Hospitals.	(Should be addressed in 2.1)
	2.4 Information technology, imaging networks and technical support should be made available for EOC's and Incident Command Posts by preplanning system architecture to support disasters . The recommendation includes establishment of a Working Group(WG2) to determine both a mechanism to support a planned coordination of access by various approved agencies and a mechanism to support this action where prior planning is not feasible or additional entities need access.	2.4.1 Gather Commanders and IT Specialist to determine tools that would be helpful 2.4.2 IT specialist to determine most efficient means of delivering tools 2.4.3 Implementation Plan prepared for Administrations 2.4.4 Administrations balance cost versus benefit 2.4.5 IT specialists implement approved portions of plan

29

Appendix 1: Task Specific Recommendations and Actions Needed Resulting from the AAIMS Consortium NDMS Exercise of May 20, 2006

Task 3 – Patient Triage & Treatment	3.1 For NDMS Patients arriving at BWI, the patients/casualties should be immediately de-planed, then triaged, tagged, and treated with coordination of activities between the Patient Administrator (PAD)) and Triage personnel.	3.1.1 Agree on the means to move patients efficiently			
		3.1.2 Prepare Job Action Sheets and ICS form that adequately describe the process and the individual roles			
		3.1.3 Test the sheets in future exercises			
	3.2 From information gathered from video documentation, conduct time/motion studies and consider with patient/provider safety to determine safest/most efficient method to move patients.	3.2.1 Simulate MASCAL patient flow using video obtained from 18 cameras during exercise			
Task 4 - Patient Transportation and Tracking	4.1 Joint civilian/military familiarization training is recommended to transfer patients from military litters, that do not fit into civilian ambulances. Additional purchases of litter backboards and stretcher innovations should be considered to facilitate this transfer and allow faster movement of patients.	4.1.1 See 1.2 and 1.2			
		4.1.2 Consider what equipment is available to assist in this process			
		4.1.3 List equipment type and amount required as compared to what is available			
		4.1.4 As funding is available, purchase additional equipment			
	4.2 Triage tagging, Patient Movement Item (PMI) and Equipment tracking and accountability should be improved to ensure 100% compliance with Triage tags.100% PMI accountability and 100% return of equipment used in MASCAL to source of distribution. This recommendation includes establishment of a working group to solve these issues.	4.2.1 Establish work group to consider matters			
		4.2.2 Prepare improvement actions			

Appendix 1: Task Specific Recommendations and Actions Needed Resulting from the AAIMS Consortium NDMS Exercise of May 20, 2006

	Recommendation	Actions Needed
Task 5 Command Post	5.1 The new NIMS Organizational Chart developed for the EXERCISE should be backed-up by a standard operating guideline (SOG) for the positions identified. This guideline should briefly identify the position's responsibility.	(See 2.1.4 and 3.1.2) 5.1.1 Gather all forms and shets developed to date 5.1.2 Determine what information is missing 5.1.3 Specialists to prepare documentation
	5.2 The NIMS Chart, SOG and IAP should be incorporated into one document to provide guidance for future tabletops, field exercises or actual events.	(See 2.1.4 and 3.1.2) 5.2.1 From information gathered in 5.1 Prepare full incident action plan 5.2.2 Duplicate plan for all potential Command and General Staff 5.2.3 Test full IAP during Future Exercises 5.2.5 Post documents in WebEOC
	5.3 Incident Command should receive real-time information from BWI flight control (as was done in July 2006 for the repatriation of over 3,000 evacuees from Lebanon).	No Action Required
Task 6 - Decontamination	6.1 BWI Fire and Rescue Service should have Decontamination (DECON) and Isolation facilities and the resources to provide PPE and training to manage decontamination of large numbers of patients	6.1.2 Assess current adequacy of Decontamination Facilities 6.1.2 Purchase additional equipment as required and as funds are available
Task 7 FDDMTF	7.1 The means of accessing the FDDMTF resource should be identified to civilian NDMS partners for use in MASCAL reception when other resources are unavailable.	7.1 Establish the correct procedures and approval process for civilian MASCAL use of FDDMTF

Appendix 1: Task Specific Recommendations and Actions Needed Resulting from the AAIMS Consortium NDMS Exercise of May 20, 2006

Task	Recommendation	Action
Task 8 Animal Care	8.1 There should be a listing of veterinary hospitals in vicinity of BWI and of military veterinary hospitals with contact information.	8.1.1 Determine which facilities are appropriate for receipt of patients
		8.1.2 Contact those facilities to determine their willingness to participate
		8.1.3 Prepare catalog of facilities and all contact information
		8.1.4 Post information on WebEOC
	8.2 There should be supplies, equipment and transport to move animals from BWI to respective vet hospitals in quarantined facilities.	8.2.1 Determine supplies and equipment required
		8.2.2 Purchase supplies and equipment as funds allow
		8.2.3 Store and maintain Cache
	8.3 Designated animal exercise area are needed at BWI.	8.3.1 Determine space and facilities required
		8.3.2 Redesign reception area to prepare for Animal Care Contingency
Task 9 Assure Safety	9.1 Safety specialists should be gathered to re-evaluate all the hazards of operating within the confines of an active airfield and develop a safety plan for future exercises or operations.	9.1.1 Gather Safety specialists
		9.1.2 Evaluate hazards and required PPE to protect providers
		9.1.3 Prepare Safety Plan to include use of PPE and placement of spotters and incorporate into IAP
		9.1.4 Prepare safety briefing to be included in IAP
Task 10 Supplies & Equipment	10.1 BWI Fire and Rescue Service should obtain additional Triage tents that are more substantial than those used in the EXERCISE, modeled on the FDDMTF, that can be adequately staked down and have protection in austere conditions.	10.1.1 Review square footage and requirements for tents
		10.1.2 Prepare technical specifications for RFP
		10.1.3 Procure tents as funds allow
		10.1.4 Train personnel on use of tents
		10.1.5 Test Tents in Future Exercises and operations

Appendix 1: Task Specific Recommendations and Actions Needed Resulting from the AAIMS Consortium NDMS Exercise of May 20, 2006

	10.2 A Soft Goods/ Class VIII Medical Supplies Cache should be on-scene, housed in readily deployable plastic containers at the triage site to support first- responders and provide initial re-supply	10.2.1 Develop a list of supplies required		
		10.2.2 Purchase supplies		
		10.2.3 Store and maintain cache		
		10.2.4 Consider the purchase of additional caches intended for exercise use		
Task 11 Reception at NDMS Hospital	11.1 Prepare a patient follow-up plan with input form the hospitals and WRAMC FCC, educate all involved personnel and design next exercise to ensure that patient follow-up does not get negated.	11.1.1 Prepare follow-up plan		
		11.1.2 Educate all personnel on use of plan		
		11.1.3 design subsequent exercises to force the use of the plan		
Task12 Media and VIPs	12.1 Gather the associated PIOs to review and familiarize themselves with the current Media Plan for BWI and research the best method to allow media additional access during an exercise without interference with exercise flow.	12.1.1 Gather PIOs		
		12.1.2 Review BWI media /VIP plans		
		12.1.3 Research exercise media plans		
		12.1.4 Prepare Public Information plan for incorporation into IAP		
		12.1.5 Evaluate plan during subsequent exercises		

Acronyms

24/7/365	-	24 hours a day, 7 days a week, 365 days a year
BCHD	-	Baltimore City Health Department
BWI-FR	-	Baltimore-Washington International Airport Fire & Rescue
CBRNE	-	Chemical, Biological, Radiological, Nuclear, Explosive
CDC	-	Centers for Disease Control and Prevention
CHHS	-	University of Maryland Center for Health and Homeland Security
C-Stars	-	Center for Sustained Trauma and Readiness Skills
DHMH	-	Department of Health and Mental Hygiene
DHS	-	Department of Homeland Security
DHHS	-	Department of Health and Human Services
DMAT	-	Disaster Medical Assistance Team
DMORT	-	Disaster Mortuary Operations Procedures
DOD	-	Department of Defense
EM	-	Emergency Medicine
EMS	-	Emergency Medical Services
EOC	-	Emergency Operations Center
EOD	-	Explosive Ordinance Disposal
FEMA	-	Federal Emergency Management Agency
FRED	-	Facilities Resource Emergency Database
GPS	-	Global Positioning Satellite
HEICS	-	Hospital Incident Command System
ICS	-	Incident Command System
ICU	-	Intensive Care Unit
MEMA	-	Maryland Emergency Management Agency
MFRI	-	Maryland Fire and Rescue Institute
MIEMSS	-	Maryland Institute for Emergency Medical Services System
MPCC	-	Maryland Poison Control Center
MSI	-	Minority Serving Institution
NDMS	-	National Disaster Medical System
NIMS	-	National Incident Management System
NRP	-	National Response Plan
NSC	-	National Study Center for Trauma and EMS
OPHPR	-	Office of Public Health Preparedness and Response
SOP	-	standard operating procedure
STC	-	University of Maryland R Adams Cowley Shock Trauma Center
UMB	-	University of Maryland, Baltimore
UMBC	-	University of Maryland, Baltimore County
UMMC	-	University of Maryland Medical Center
UMMS	-	University of Maryland Medical System
UMSOM	-	University of Maryland School of Medicine
WMD	-	Weapons of Mass Destruction
WRAMC	-	Walter Reed Army Medical Center

Agencies, Institutions & Entities
Attending NDMS Training & AAIMS TTX July 12th

Academia
Center for Health & Homeland Security (CHHS)
Critical Event Preparedness & Response (CEPAR)
International Association for Healthcare Security & Safety (IAHSS)
JHU
National Study Center (NSC)
UMBC
UM-Office External Affairs

Airport
BWI Fire & Rescue
Delaware Air National Guard
Maryland State Police Aviation Command
Maryland Transport Authority Police-BWI Administration
MD Air National Guard

Industry
Northrop Grumman

Military
48th Combat Support – Hospital
Maryland National Guard
Telemedicine Advanced Technology Research Center (TATRC) Ft. Detrick
US Air Force/C-STARS/Shock Trauma Center
VA Maryland Health System
Walter Reed Army Medical Center

State / City
Baltimore City Health Department & Office of Health Preparedness and Response
DHMH
Governors Office for Homeland Security
Maryland Defense Force
Maryland State Police

MEMA
MIEMSS
UMB Police

EMS Providers/Fire Department
Baltimore City Fire Department
Baltimore County
BWI Fire & Rescue
Caroline County
Howard County Fire Department
MIEMSS Region II & III
Potomac Heights Vol.

Hospitals
Anne Arundel Med Center
Bon Secours
Calvert Memorial
Caroline County
Doctors Community
Franklin Square
Greater Baltimore Med Center
Howard County
Maryland General
Memorial Hospital Easton
Mercy
Mt. Washington Pediatric
North Arundel
Northwest
Shady Grove
Shore Health System
Southern Maryland
Union Memorial
University of Maryland
VA Hospital
Washington County
WRAMC

Acknowledgement

AAIMS Planning Meeting

Christa Singleton	Baltimore City Health Commissioner's Office
Jake R. West, Jr.	Director, Martin State Airport
Chief Woody Cullum	BWI Airport Fire Rescue
Col. (Rtd) Tony Story	Jackson Foundation
Col. Jim Grove	Maryland National Guard
Maj. Jim Hock	Maryland State Police
Sgt. W. Patrick King	Maryland State Police
John Donohue	MIEMSS
Colin Mackenzie	NSC
Jon Mark Hirshon	NSC
Linda Pelletier	UMMC
James Jaeger	UMB Environmental Health & Safety
Ed Fishel	UMB Media Relations
Chief Edward Ballard	UMB Police
Capt. John Christian	UMB Police
Jeff Gilberg	Center for Health & Homeland Security
Deborah Silver	Center for Health & Homeland Security
Capt. Jeffrey Ball	USAF/C-STARS MD
Col. Edward Griffin	WRAMC
LTC Philip Wasylina	WRAMC
Sharon Kellogg	VAMHC
Alfred Cardona	MIEMSS
Ruth Vogel	MEMA
Richard Strickland	MEMA
Col. William Farthing	48th Combat Support Hospital
LTC Michael O'Guinn	48th Combat Support Hospital

Appendix 5 AAIMS VIP Attendance

Last Name	First Name	Organization	Loc	Rank	VIP	Duty Position/Title	EMAIL
Austin	Brad	HHS	DC		√	HHS	Brad.Austin@hhs.gov
Bass	Robert	MIEMSS	MD		√	Executive Director, MIEMSS	rbass@miemss.org
Beall	Jack	DHS			√	DHS	jack.beall@dhs.gov
Bochicchio	Daniel		Dc	LTC	√		daniel.bochicchio@ngb.ang.af.mil
Callahan	Charles	WRAMC	DC	COL	√	Deputy Commander for Clinical Services	charles.callahan@na.amedd.army.mil
Carlton	P		TX	LT GE	√		carlton@tamhsc.edu
Ceraul	Rebecca	PIO	MD		√	PIO UM	rceraul@som.umaryland.edu
Cohen	Stuart	WRAMC FCC	DC	MAJ	√	NDMS FCC Res Spc	stuart.cohen@na.amedd.army.mil
Droneburg	John	MEMA			√	Director, MEMA	jdroneburg@mema.state.md.us
Emmer	Casey	U.S Dept. of Human Health Services	DC	Mrs.	√	Planning and Emergency Response Coordination	Casey.Emmer@hhs.gov
Fishel	Ed	UMB	MD		√	PIO UMB	efishel@umaryland.edu
Gagliano	David	NGC	VA	NGC	√	NGC	david.cagliano@ngc.com
Geregon	Cheryl	NORAD-NORTHCOM/SG	CO	COL	√	Director, Current Operations	cheryl.geregon@northcom.mil
Gilbert	Gary	TATRC	MD	COL(I	√	TATRC	gilbert@tatrc.org
Granger	Elder			MG	√	Major General	elder.granger@tma.osd.mil
Griffin	Edward	WRAMC	DC	COL	√	Chief, WRAMC NDMS FCC	edward.griffin@na.amedd.army.mil
Grove	James	MDNG	MD	COL	√	MDNG	james.grove@md.ngb.army.mil
Hall	Donald	NARMC	DC	COL	√	Chief of Staff, Operations	donald.hall@na.amedd.army.mil
Handley	Chris	NSC	MD		√	NSC	chandley@som.umaryland.edu
Hu	Peter	NSC	MD		√	NSC	phu@umm.edu
Johnson	Steve	Shock Trauma	MD		√	Surgeon	sbjohnson@umm.edu
Jones	Jim	WRAMC	DC	LTC	√	NDMS Patient Administration Officer	jim.jones@na.amedd.army.mil
Kornos	William	OASD(HA)	DC	LTC	√	Department of Defense Health Affairs	william.kornos@ha.osd.mil
Lap	Truong	NGC	VA		√	Mission Systems	lap.truong@ngc.com
Matthews	Larry	U.S. Army Medical Command Medical	TX	COL	√	US Army DHS, NDMS FCC Director	larry.matthews@amedd.army.mil
Mayer	Harry	U.S Dept. of Human Health Srvc., Reg. III	PA	Mr.	√	Senior Regional Emergency Coordinator	Harry.Mayer@HHS.gov
McGowan	Merrily	WRAMC	DC	COL	√	Director, Patient Administration Division	merrily.mcgowan@na.amedd.army.mil
Montminy	Diane	Mobile Medical			√		
Olson	Jim	TATRC	MD	COL(I	√	Chief of Staff, TATRC	olso@tatrc.org
Pak	Hon	TATRC	MD	LTC	√		pak@tatrc.org
Pemberton	Philip	WRAMC	DC	LTC	√	Chief Operations Officer	philip.pemberton@na.amedd.army.mil
Poropatich	Ron	TATRC	MD	COL	√		ron.poropatich@det.amedd.army.mil
Portals	Francisco	TATRC	MD	MAJ	√		portals@tatrc.org
Post	James	2290th USAH	DC	COL	√	Commander, 2290th USAH	james.post@us.army.mil

Appendix 5 AAIMS VIP Attendance

				COL			
Roller	Jeffrey	TATRC		COL	√	Director, TATRC	roller@tatrc.org
Schrader	Dennis	Gov. Office	MD		√	Director, DHS	dschrader@GOV.STATE.MD.US
Stamp	Clay	MIEMSS	MD		√	Director	cstamp@miemss.org
Tang	Nelson	NGC	VA		√		nelson.tang@ngc.com
Webster	Tom	Naval Med. Education & Training Com.	MD	Mr.	√	Visual Information Directorate	twebster@nmetc.med.navy.mil
Williams	Calvin	WRAMC	DC	COL	√	Deputy Commander for Administration	calvin.williams@na.amedd.army.mil

TTX 1 AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium Table Top
Exercise 1 (TTX 1)

AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium Table Top
Exercise

(TTX) July 12, 2005

Acknowledgements:

TTX 1 AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium Table Top
Exercise (TTX 1)

Table of Contents

TTX 1 AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium Table Top Exercise (TTX 1)

Executive Summary

This executive summary reports on the Airport, Academia, Industry, Military, State (AAIMS) Consortium Table Top Exercise (TTX), a one-day exercise held on Tuesday, July 12, 2005 in preparation for a functional exercise in May 2006. The exercise was co-sponsored by: The National Study Center for Trauma and EMS, the Maryland Institute for Emergency Medical Services Systems (MIEMSS) and the Maryland Emergency Management Agency (MEMA)

The TTX applied incident command structure and resources for Mass Casualty (MASCAL) reception, activation of the National Disaster Management System (NDMS) reception plan, and exercising of the Mutual Aid Agreement between Walter Reed Army Medical Center (WRAMC) and MIEMSS to access civilian surge capacity beds.

The TTX provided an excellent introduction to NDMS and face to face interactions with military partners for participants who had little or no previous experience in NDMS activation. The TTX identified several weaknesses in coordination among the agencies, personnel and facilities responding to the MASCAL scenario. In a real event these shortcomings could have seriously impaired the expeditious emergency management and distribution of military casualties to civilian hospital surge capacity.

Ten recommendations were made in response to five major findings (see summary findings on pages 10 to 12 from the evaluations of the TTX) and from self evaluations by the participants. The recommendations included review of existing NDMS MOU's, increased training and NDMS exercises, development of operational protocols for MASCAL reception, triage, transportation and staging. It was further recommended that military and civilian NDMS partners should meet to establish the NDMS reception plan, both for military casualty access to civilian hospitals and vice versa. NDMS hospitals should have a reception team and performance measures for timely acceptance of MASCAL, and they should exercise their individual Emergency Operation Centers. NDMS hospitals should jointly develop procedures for common tasks related to NDMS activation, sharing of resources and assets for likely MASCAL scenarios. Maryland NDMS should have a medical reception team responsive in less than twelve hours. Communication capability should be enhanced between NDMS hospitals and a single state agency and all TTX participants should be trained in command and control structure and communication procedures. Future NDMS TTX should include organizational and exercise control changes to improve information flow and learning.

The suggested actions in this report should be viewed as recommendations only. It is the "Agency's" responsibility to identify and implement the solution(s). Each agency should review the recommendations and determine the most appropriate action and the time needed to implement the recommendation.

TTX 1 AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium Table Top Exercise (TTX 1)

Exercise Objectives

2. Apply the NIMS ICS to evaluate Communication Information, and Resources for Continental US (CONUS) reception of mass casualties (MASCAL)
3. Test the process of activation of the National Disaster Medical System (NDMS) using voice, data, and information management systems in response to an OCONUS mass causality incident
4. Review then apply web-based training programs for NIMS ICS (http://trainmg.fema.gov/EMIWeb/)

Exercise Design

The exercise was designed to address the three exercise objectives. The morning portion of the exercise was spent on educating the participants in Incident Command and Unified Command Systems utilizing Subject Matter Experts (SME). The second portion of the morning was spent in an introduction of the NDMS and a walk through of events leading to NDMS activation. The afternoon portion of the day was spent on the actual table-top.

The exercise focused on simulating the reception of patients through the National Disaster Medical System. The TTX simulated the receipt of 100 patients at Baltimore/Washington International Airport within a 24 hour period. The table-top exercise was intended to develop initial procedures to receive, evaluate, treat, and transport patients to NDMS Hospitals in Maryland.

Logistics

The TTX took place at the Maritime Institute of Technology (MITAGS) Linthicum, MD 21090. Two operational level personnel were invited to attend from agencies and facilities involved in activation of the National Disaster Medical System (NDMS).

Prior to attending the TTX all participants were requested to complete the two free online Emergency Management Institutes (EMI) Independent Study ICS courses. (ISO-700 National Incident Management System (NIMS) and IS-195 Basic Incident Command System (at http://training.fema.gov/EMIWEB/)

The morning consisted of plenary presentations by Walter Reed Army Medical Center (WRAMC) and Maryland Emergency Management Agency (MEMA) on NDMS training and ICS training. The NDMS Reception plan and the background to the scenario for the TTX were presented before the lunch break. After lunch the more than 100 participants chose their room assignments from Auditorium: Incident Site, Reception/Treatment Area, On Scene Command; Registration Table (Outside Auditorium), Transport/Staging; Room 300, NDMS Hospitals; Room 303, Table Top Control Room; Room 304, Civilian Communication; Room 305, Military Communications; Public Information Officers (PIO's) acted as messengers and Public Health Representatives moved about all NDMS rooms.

TTX 1 AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium Table Top Exercise (TTX 1)

Exercise Scenario

Casualty rates in an Outside Continental United States (OCONUS) mission climb and an overwhelming number of soldiers are sent to Walter Reed Army Medical Center (WRAMC) and Bethesda Naval Hospital. Several hundred casualties occurred due to severe food poisoning. Walter Reed Army Medical Center (WRAMC) and all local Veterans Administration (VA) hospitals surge to capacity. FEMA/DOD tasks the 48th Combat Support Hospital to establish and support the WRAMC Patient Reception Center (PRC). The National Disaster Medical System (NDMS) is implemented and the Mutual Aid Agreement between WRAMC and the Maryland EMS is activated to provide beds for military casualties in civilian hospitals. WRAMC notifies and requests MIEMSS for Bed Availability. MIEMSS is notified to prepare to accept 100 patients within a 24-hour period.

The "players" in the exercise were tasked to simulate communications and information exchange, the unloading, triage, treatment, and transportation of patients through out Maryland hospitals. The simulation involved the landing of a military Air Transport Aircraft; with the US Military's 48th Combat Support Hospital (CSH) personnel tasked with the initial triage of patients. The hospital coordination and medical transportation component was coordinated by MIEMSS using local hospitals, and transport providers to distribute patients through out Maryland.

Evaluation Methodology

The evaluation team agreed that the Homeland Security Exercise Evaluation Guidelines (EEG) would serve as the basis for the evaluation tools. The team pulled the applicable EEG's and created several data collection tools in MS Excel. The tools were distributed to the applicable functional groups for functionality and usability. Data Collectors/Evaluators were recruited from each of the functional disciplines. The data collectors were briefed of the exercise and asked to comment and recommend any changes to the evaluation tools. On the day of the exercise the data collectors were given instructions, a radio, clip board, and the data collection instrument that applied to the function they were to evaluate. The data collectors documented their findings and the data collection instruments were returned upon completion of the exercise. The data collectors were then instructed to submit a brief narrative of their observations and any recommendations on which to improve the data collection instrument.

Summary "Hotwash" Findings from Each Group

Incident Command

- 1st interaction as team players. Not involved in pre-planning
- Plans already in place
- Need military, BWI, MIEMSS (Dr. Alcorta) meeting
- Dealt with safety issues
- Issue joint information center.

- Liaison issues back and forth between agencies.
- NIMS/ICS used a majority of the time
- Issues
  - The policies, procedures and plans need to be determined prior to the exercise – had the foundation but needed to move forward from it.
  - Interaction between key players should occur prior, in order to establish a working rapport.
  - How to get together with military and shared resources. Mission- work with military, VA to see that soldiers are taken care of and transported to proper facility

Transportation & Staging

- Drawback- geographically separated from scene, command staff, triage, and other activities.
- Didn't know when scenario started. Discussed plans, i.e. what we would do if they were a transportation sector.
- Notified about conference call from EMRC.
- Specialists designated. Decided that Air transport would be needed.
- Established early liaison with 48 CSH
- Liaison between triage and transportation center needed.
- Had ground and air operations officers.
- Arranged for MD Aviation to supply fuel truck.
- Issues
  - Needed to know if Dr. Alcorta or a representative was going to come to assist with triage.
  - Sent reps to clarify any issues with communication, lack of co-location.
  - We were never asked how many helicopters needed, where they would go, how soon they would be needed. Those 3-5 minutes for a request are critical.
  - Weren't cognizant of true incident command structure

Hospitals

- Spent a lot of time waiting; during wait time, each did internal assessment (i.e. bed status, what resources were available)
- 100 patients total did not seem to overwhelm them. No more than 10 per hospital.
- Look at OR schedule to see what OR s could be freed up.
- In real situation MIEMSS would have been bombarded with us asking for information from them instead of them giving information to us. Kept asking for info.
- When found out information they would be receiving, activated internal command system, activate PIOs.

- Command Structure: Where would city/county EOC fit in? In biological incident, hospitals would look to these.

Civilian Communications- MEMA

- Stress: Utilize WebEOC. We would like information to come through that. MEMA would probably bring in 5-6 agencies, not entire SEOC. MIEMSS, DHMH, military to get them down to BWI airport.
- Would MEMA activate?
  MJOC staffed 24/7 by MEMA and MDNG
- Civilian Communications- MIEMSS
  o Disconnections:
  o Many communications DHMH, MEMA and lead agencies define the magnitude of the event.
  o Finite or ongoing incident?
  o Impact on incident command, hospitals and on medical communications.
  o Until we had done several things, we would not have moved anything on site- that was a disconnect
- Some hospitals could have received as many as 20 patients.
- Notification process: Broader for alerting. In this particular scenario, BWI, hospitals, military, MEMA, DHMH, MIEMSS, transports. Ground vs. air and EMS vs. private ambulances – need to make policy decisions on what to use. Should we have a component in standby
- Identification to patients themselves and their special needs. Ventilators, traction splints, medications, etc. Can EMT handle those patients? Are there enough EMTs?
- Destination: Hospitals need to know how many patients they are getting, what in particular their problems are. TRACES form- making sure it has all pertinent information.
- Personnel networking is key in this disaster.
- Loading process – Most stable loaded in first, least loaded in last. Reverse true on disembark. Does this change our destinations?
- Planned Improvement * Adapt and apply to exercise. Please give feedback! ralcorta@miemss.org
- Improves our communications links between organizations from PIOs.
- PIOs need to be involved. Contact Efishel@umaryland.edu

48th CSH

- Patient Reception
- 2 Issues
  o De-conflict task of every major group here
  o Identify who does what
  o Improve information flow.
  o Reduce Overlap of roles.

- Positive Points:
  - o Great variety of organizations
  - o Everyone was involved, ready to do their work.

WRAMC/ NDMS

- Breakdown of situational awareness. Didn't know who we were. Kept getting messages from WR.
- Missing key parties from exercise. Would ask questions but party was not there to respond.
- No manifest for awhile. When did, MIEMSS was behind. Delay in distribution of info to hospitals.
- Had to delegate someone else to come over and help.
- Communication problems – cut off from plane site, did not get 48th CSH request for space at BWI until plane was 15 minutes out, no communication with military whatsoever.
- Positive:
  - o VA joined WR staff. Gave added support. Had extra runner. Teamwork.
  - o WR/VAMHCS relationship improved.
  - o Developed VA/DOD
- Need improvement:
  - o Communications,
  - o WR vs. NDMS
  - o IC identification

SUMMARY : Five Findings and Ten Recommendations

Finding 1: Activation of NDMS in Maryland has never occurred (the only other exercise was in the 1980's) so that most of the TTX participants had no experience of NDMS response or in interacting with the U.S. Military, our partners in the TTX.

Recommendation 1a

The NDMS operational plan of state agencies should be reviewed and Memorandum of Understanding (MOU's) among all state agencies standardized and updated.

Recommendation 1b

The State, County and Local emergency response personnel should be regularly trained and exercised on the NDMS plan.

Recommendation 1c

Operational protocols are required that identify procedures for mass casualty reception, triage, transportation and staging

- Conformity between civilian and military NDMS procedures for reception, treatment, on scene command, transportation/staging.
- Standardized public information statements for official use.
- Identification of airport exit routes to NDMS hospitals recommended access.

Finding 2: There was a lack of understanding of the Mutual Aid Agreement and the Incident Action Plan between military and civilian Emergency Management personnel and agencies.

Recommendation 2a

For military contingency operations NDMS partners should establish which parts of the Mass Casualty reception the military controls, the procedures and situations in which sharing with civilian authorities will occur. Conversely procedures for civilian mass casualties accessing military hospital bed surge capacity should be developed.

- Federal, military, state, local, industry, healthcare, and academia NDMS partners should meet to improve their mutual role understanding for NDMS activation, unified command performance and information flow.
- NDMS Incident Command training is required to improve liaison with functional response units and promote situational awareness among the civilian and military NDMS responders.

Finding 3: NDMS Hospitals have no plan for receiving the MOU agreed upon number of casualties within a finite time window.

Recommendation 3a

NDMS Hospitals should have a reception team and should define performance measures for admission of their designated number of NDMS Mass casualties.

Recommendation 3b

Each NDMS Hospital should regularly exercise their Emergency Operation Centers, activate and evaluate the NDMS plans to open military and civilian liaisons, find NDMS beds, transport and practice preparations to receive mass casualties.

Recommendation 3c

NDMS hospitals should jointly develop procedures for common tasks related to NDMS activation, determine resource and asset sharing for likely "what if" NDMS scenarios.

Recommendation 3d

The Maryland NDMS should have a "medical reception team" that can respond in less than 12 hours for mass casualty triage, treatment, transport and to take on Incident Command responsibilities.

Finding 4: Communication failures between the Incident Site and both military, civilian, city, state agencies and hospitals prevented NDMS partners from receiving accurate and timely notice of NDMS mass casualty status and transports to prepare for their coordinated response.

Recommendation 4a

> There should be duplex voice, data and image communication capabilities between NDMS hospitals and unified command patched through a single state agency.

Recommendation 4b

> All exercise participants should be trained in medical management, command and control structure and communication procedures.

- Improve coordination and liaison between Military, Airport and MIEMSS.
- Refine and communicate policies and procedures for NDMS Reception Center.
- Unified Command should brief all sections, develop and communicate the Incident Action Plan.

The Functional exercise in May 2006 should test specific improvements instituted as a result of this exercise and should include a focus on establishing Incident Command, Communications between all agencies and public information measures.

Finding 5: Future TTX need organizational changes:

- All participants in a single room to improve information flow
- Easier access to computers/Web EOC
- Tighter control of TTX by exercise controllers/facilitators
- Mentoring by NDMS expert during TTX
- 100 patients were insufficient to "stress" the NDMS system.

Appendix 7
TTX 2 AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium Table Top
Exercise 2 (TTX 2)

AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium Table Top
Exercise

(TTX) February 21, 2006

Acknowledgements:

TTX 2 AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium Table Top
Exercise 2 (TTX 2)

Table of Contents

TTX 2 AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium Table Top Exercise (TTX 2)

Executive Summary

This executive summary reports on the Airport, Academy, Industry, Military, State (AAIMS) Consortium Table Top Exercise 2 (TTX 2), a one-day exercise held on February 21, 2006 in preparation for a functional exercise in May 2006. The exercise was co-sponsored by the Maryland Institute for Emergency Medical Services Systems (MIEMSS), Walter Reed Army Medical Center (WRAMC), National Disaster Medical System (NDMS), and BWI Fire and Rescue.

The TTX applied incident command structure and resources for Mass Casualty (MASCAL) reception, activation of the National Disaster Management System (NDMS) reception plan, and exercising of the Mutual Aid Agreement between Walter Reed Army Medical Center (WRAMC) and MIEMSS to access civilian surge capacity beds.

The TTX 2 identified several weaknesses that in a real event could have seriously impaired the expeditious emergency management and distribution of military casualties to civilian hospital surge capacity.

Four recommendations were made in response to five major findings (see summary findings on pages 8 to 9 from the evaluations of the TTX and from self evaluations by the participants. The recommendations include continued update and exercise of activation plans and cooperative agreements established by state and local agencies. It should also be ensured that the Incident Command Structure is promptly established and staffed with personnel from the appropriate organizations. Standard operating procedures should outline the chain of command and points of contact for possible use of electronic means which may help streamline receipt of mission orders (i.e. voice, fax, and e-mail). MOU development and activation plans should include that participating NDMS agencies provide a list of approved communications devices and frequencies that will be used to support an incident.

Exercise Objectives

1. Test and evaluate the revised NDMS activation plan and MOU jointly developed by MIEMSS/WRAMC & BWI Fire and Rescue
2. Apply the NIMS ICS principles to evaluate communication information, resources for CONUS reception of mass casualties
3. Test the process of activation of the NDMS using voice, data, and other information management systems

TTX 2 AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium Table Top
Exercise (TTX 2)

Exercise Design

The exercise was designed to address the three exercise objectives. Findings from TTX 1 were used to improve the planning and organization of TTX 2. One room was used for TTX 2, and all attendees sat at one table, facilitating discussion and actions, improving the flow of information in comparison to TTX 1 held in July 2005. The subject matter experts were in the same area as the TTX participants, aiding in providing guidance and coordination of efforts required within their areas of responsibility. Working relationships and lines of communication had already been established as a result of TTX 1 and the AAIMS planning meetings covering the previous 10 months; therefore, most requirements to support the MASCAL incident were already understood between the parties involved. Many of the aspects of the TTX were worked through as a paper drill; however, the actual actions which were necessary were discussed and annotated for future reference. All finding and recommendations from the previous TTX were reiterated and encompassed to ensure optimum support to the incident. A 'Hotwash' debrief followed the conclusion of TTX 2 and included reporting by the TTX evaluators and all section leaders in the TTX.

Logistics

The TTX 2 was held at the Maritime Institute of Technology and Science (MITAGS). This environment and the facilities had been favorably evaluated by attendees at the July 2005 TTX. A smaller number of invitees attended the TTX2 and fewer VIPs participated, making the proceedings less formal and more like a Working Group meeting.

Exercise Scenario

CONUS/OCONUS MTF's and U.S. Based VA hospital systems are at 90% occupancy rate, with minimal bed expansion capability remaining. Andrews Air Force Base Reception Center has limited patient reception operations and NNMC cannot receive anymore patients. Notification has been sent through military channels that an OCONUS MASCAL occurred in Baghdad, Iraq as a result of a suicide bomber attack. There are no contaminated casualties.

To prepare for the reception of the OCONUS MASCAL, the WRAMC Commander/FCC Director initiated the DOD/VA sharing agreement to shift WRAMC patients to VISN-5 VA hospitals in order to support incoming patients.

WRAMC Commander/FCC Director, through channels, requests to activate its NDMS FCC ISO Contingency Patient Reception Operations at Baltimore Washington International Thurgood-Marshall Airport, to support Military Contingency Operations.

Evaluation Methodology

There were five evaluators who were trained by MEMA (George Mitchell). Each evaluator was assigned to record details of the roles of the participants in TTX 2 .They prepared their reports and submitted them to Colin Mackenzie for synthesis and completion of a Draft After Action Report for distribution and comment. There was a Self – Evaluation completed by the TTX 2 participants.

Summary "Hotwash" Findings from Each Group

WRMC

- Important for all to know
  - Mission assignment #
  - Execute order North Com

Figure 1: Disaster Response
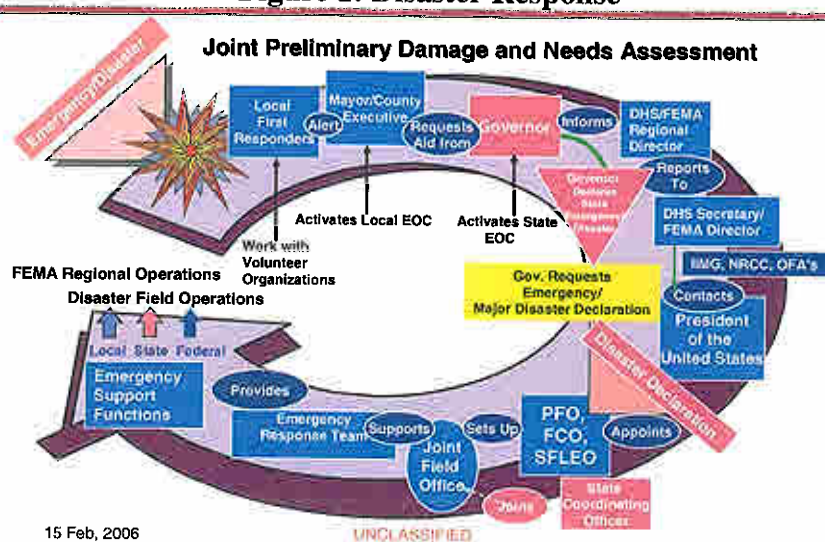
  - Patient reception team / litters
  - Military patient administration staff / hospital interface Diagram process

VA

- Include transporters (EMS) in early notification
- Consider transport surge capacity and its effects later in the exercise
- Inter-operational communications / minimize jargon

MIEMSS

- Hospital communications process/FRED changes

**Figure 2: Communications and Information Flow Needed to Assess MASCAL
Bed Availability Status**
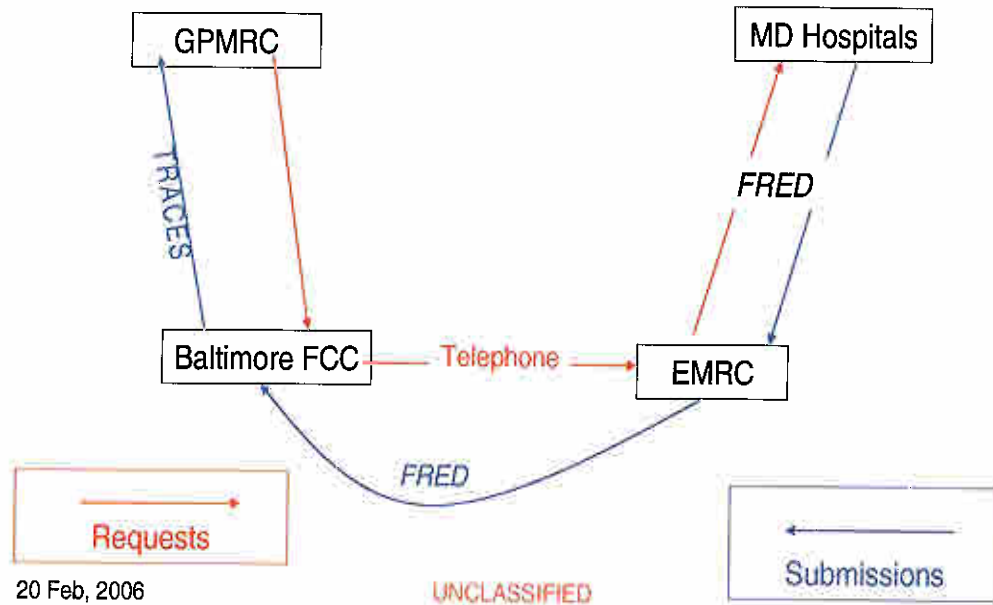
- Checklist for hospitals
- NDMS hospital coordination
- 3 separate command structures:
  - Pre
  - Patient arrival
  - Post – all patients allocated to hospitals
- Checklist for coordination call

MEMA

- Open communication with hospitals (Fig. 2)
- ICS chart
  - Pre
  - Patient arrival
  - Post

Figure 3: Maryland NDMS Reception Plan Command Structure

Maryland NDMS Reception Plan
Command Structure
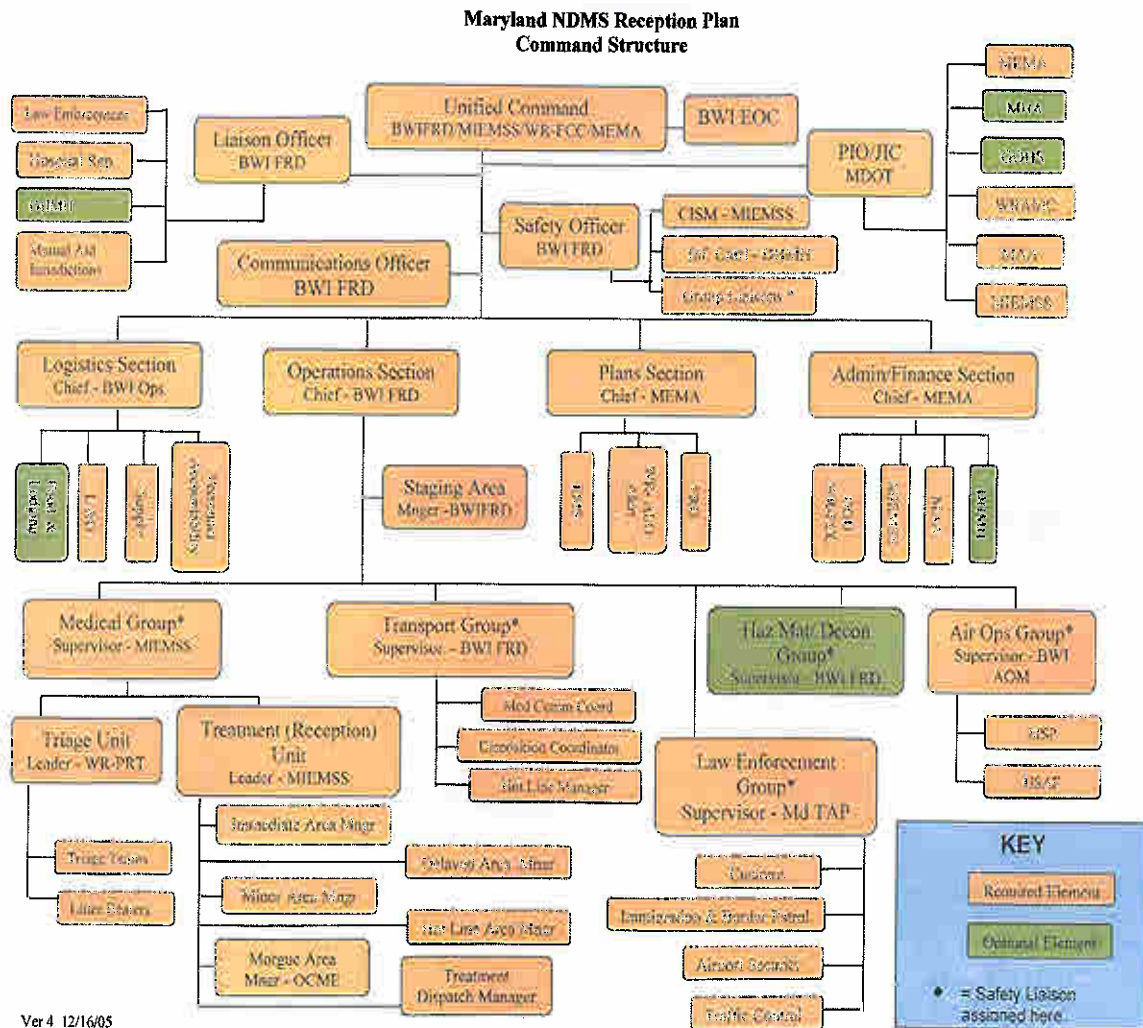
- Importance of checklists
- Contingency plans/Plan B's

BWI

- Appreciation airport operations / security issues
- Several possible site locations

Figure 4: Proposed Patient Reception Area at BWI Airport for Functional Exercise
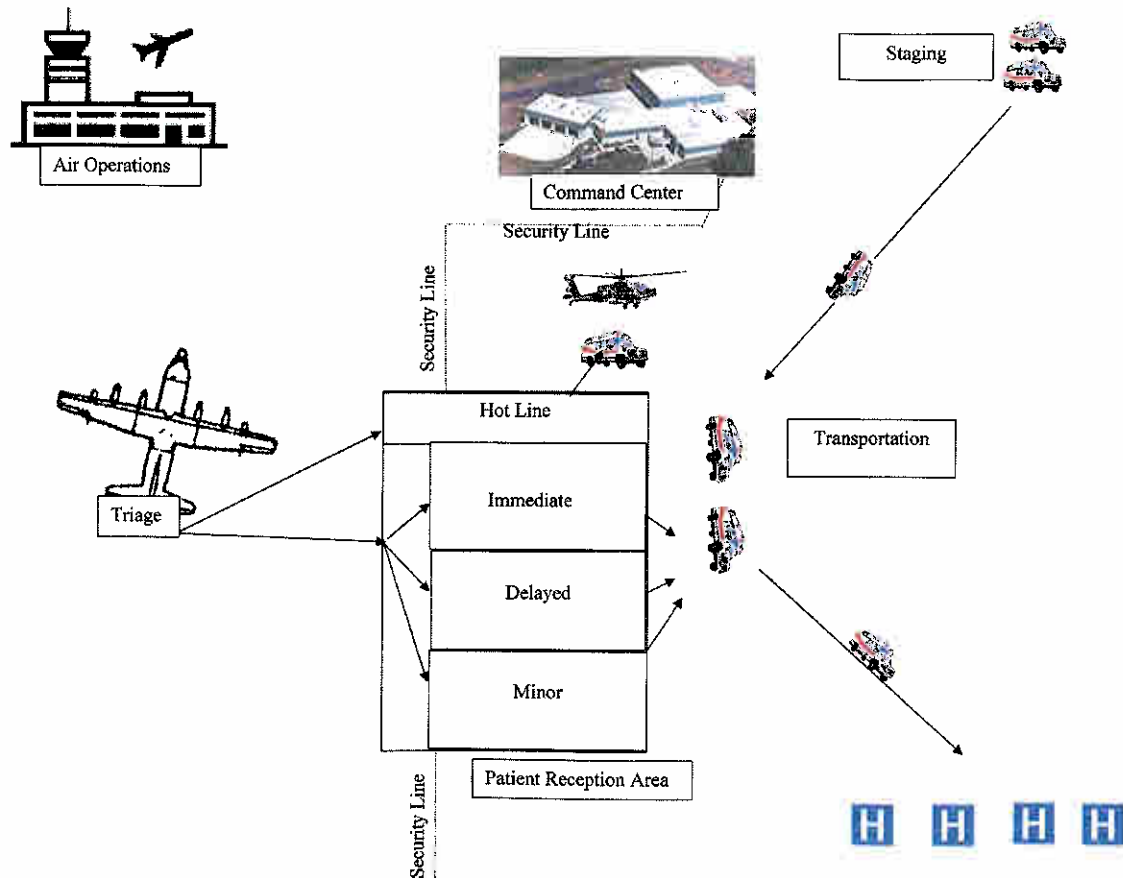
- Reception area logistics
- Security plan
- Appreciation of ability to do job when needed

Hospitals

- Communication (Fig. 2)
- Hospital checklist
- Liaison with hospitals for preplanning

Figure 5: Patient Disposition and Records
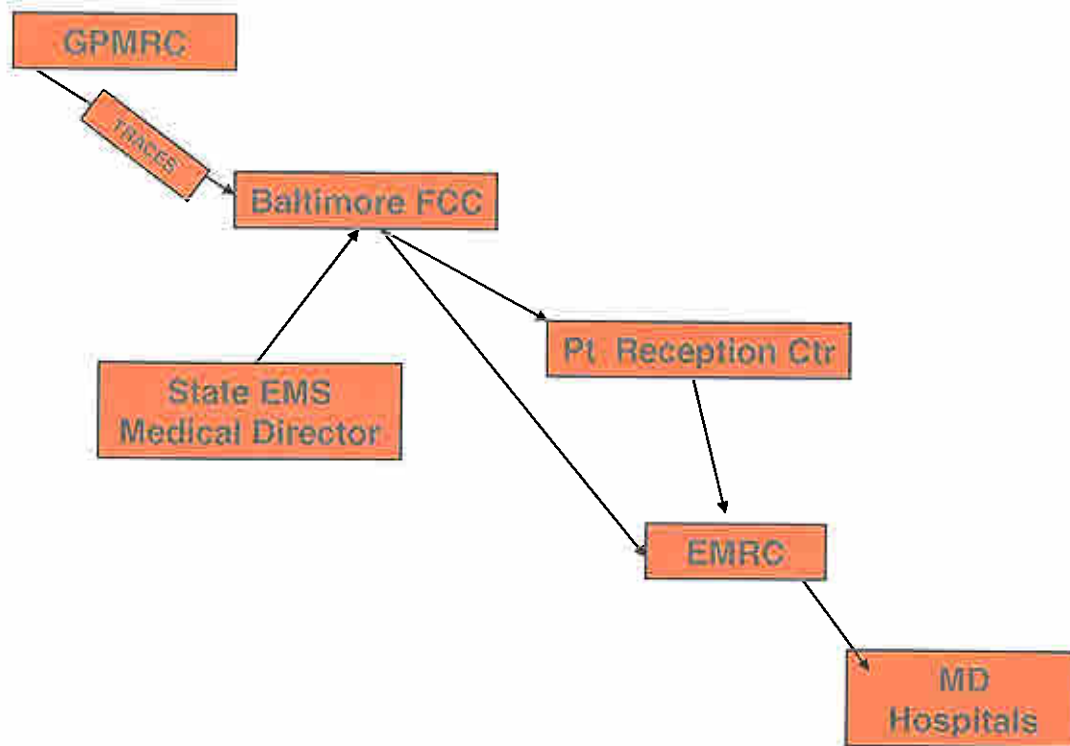
20 Feb, 2006   UNCLASSIFIED

- Protocol for military patients in civilian hospitals (Reference tri-care system)

NSC

- Need task lists for likely scenarios
- MD NDMS medical reception team
- Communications systems – no details about how this will be achieved

SUMMARY : Five Findings & Five Recommendations

A. Mission Execution

Finding 1: In TTX 2, each entity understood their roles in relation to the incident at hand. Command and control was quickly established with minimal disruption.

Requisite reporting procedures were followed according to established guidelines
and memorandums of understanding were immediately implemented.

    <u>Recommendation 1</u>
        Continue to update and exercise activation plans and cooperative
        agreements established by state and local agencies.

B. Policies and Operating Procedures

Finding 2: All participants were intimately familiar with their organizations'
standard operating procedures with respect to disaster preparedness. Bed status
reporting along with logistics requirements were communicated to the ICS. The
identification of local resources and admission policies was applied to the
exercise play.

<u>Recommendation 2</u>

    None

C. On-site Coordination

Finding 3: During a MASCAL event, the incident site will be the most
challenging area. Logistics coordination, along with identifying assets, interaction
with the media and various levels of command and control issues will likely be
problematic and enhance the confusion. Security measures will also require
constant vigilance as the MASCAL event is at a busy commercial International
Airport.

<u>Recommendation 3</u>

    Ensure the Incident Command Structure is established immediately and is
    staffed with the requisite personnel representing the organizations
    responsible for supporting the incident site. Review policies and
    procedures to determine if all aspects in relation to supporting the incident
    site are covered i.e. PIO, graves registration, escort issues, security, triage,
    and identification of assets.

D. Military Support

Finding 4: Activation of NDMS is under the auspices of the Walter Reed Army
Medical Center; use of these assets along with other DOD units requires an
execution authorization from the Military Command Authority and/or a mission
request number (Fig. 1).

Recommendation 4

Ensure standard operating procedures outline chain of command procedures and points of contact for possible use of electronic means i.e. voice, fax, email which may facilitate receipt of mission orders.

E. Communications Compatibility

Finding 5: One aspect of TTX 1 which was not fully realized was that of the communications requirements with respect to the various coordinating organizations and their communications equipment. This needs to be addressed for the FX. It's assumed that the local hospitals along with its corresponding emergency medical services transmit on the same frequencies however, how will communications be handled with the military units operating in support. What will be the primary source for communicating, land lines, cell phones, or satellite phones and where will these efforts be located? Also are these devices approved for use in an airport flight zone of operation?

Recommendation 5

As part of activation plans and MOU development, participating NDMS agencies provide a list of approved communications devices and frequencies that will be used to support an incident.

TTX 2 AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium Table Top Exercise (TTX 2)

Agencies, Institutions & Entities
**Attending AAIMS TTX 2 February 21, 2006**

BWI Airport Administration
BWI Fire & Rescue
Maryland National Disaster Medical System (NDMS) Hospitals
Maryland National Guard
Maryland Institute for Emergency Medical Services System (MIEMSS)
NDMS
National Study Center (NSC)
University of Maryland Medical Center (UMMC)
Walter Reed Army Medical Center (WRAMC)

FX AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium NDMS
Functional Exercise (FX)

AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium NDMS
Functional Exercise (FX)

Functional Exercise(FX), May 20th, 2006

Acknowledgements:

FX AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium NDMS
Functional Exercise (FX)

Table of Contents

FX AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium NDMS Functional Exercise (FX)

Executive Summary

This executive summary reports on the Airport, Academia, Industry, Military, State (AAIMS) Consortium NDMS Functional Exercise (FX) , a one-day exercise held on, Saturday May 20th, 2006 to test the revised Maryland EMS National Disaster Medical System (NDMS) Patient Reception plan resulting from three earlier Table Top Exercises (TTX) held in preparation for this limited FX in May 2006. The exercise was co-sponsored by: The National Study Center for Trauma and EMS, the Maryland Institute for Emergency Medical Services Systems (MIEMSS), Walter Reed Army Medical Center (WRAMC/NDMS) and the Maryland Emergency Management Agency (MEMA).

The FX applied National Incident Management System (NIMS) Incident Command Structure (ICS) and resources for Mass Casualty (MASCAL) reception, activation of the National Disaster Management System (NDMS) reception plan, and exercising of the revised Mutual Aid Agreement between Walter Reed Army Medical Center (WRAMC) and MIEMSS to access civilian surge capacity beds through the MOA with BWI Fire and Rescue.

The FX provided a test of the excellent face to face interactions with military partners during the prior 12 months of planning and an introduction to field application of NIMS, ICS, NDMS and MASCAL reception for participants who had little or no previous experience in NDMS activation. The FX identified several issues that in a real event could have affected the expeditious emergency management and distribution of military casualties to civilian hospital surge capacity.

Key Overall Achievements AAIMS/NDMS
1. First Maryland National Disaster Medical System (NDMS) exercises in more than 20 years.
2. Established significant levels of military- civilian collaboration during more than 20 two hour long meetings.
3. Optimized State Inter Agency cooperation and planning for activation of NDMS in response to natural or man-made mass casualty incidents either in the U.S. or abroad.
4. Exercised the NDMS and National Incident Management System (NIMS) and Incident Command System (ICS) with multiple state agencies and military medical systems (including VAMS) participation and involvement of the majority of civilian NDMS hospitals in Maryland.
5. Facilitated revisions of the Maryland Emergency Operations Plan to include the NDMS activation plan across all key emergency response State Agencies.
6. As a result of the AAIMS/NDMS collaboration and interagency, civilian and military cooperation, Maryland is set to become the first state to have the NDMS plan incorporated into their Governor's Emergency Operations Plan.

7. **Baltimore – Washington Thurgood Marshall International Airport (BWI) has established and exercised procedures for use of a specific site on the airfield to conduct reception and triage of multiple patients and allow transportation to NDMS hospitals that can be activated without impeding normal civilian activities for this busy international airport.**

The task specific recommendations and actions needed resulting from the AAIMS Consortium NDMS FX of May 20th, 2006 are shown in Appendix 1.

Exercise Objectives

1. Test and Evaluate the Revised NDMS activation Plan and MOU jointly developed by WRAMC NDMS, MIEMSS, BWI Fire & Rescue Service (BWIFRS).
2. Apply the NIMS ICS principles to evaluate Communication, Information, and Resources for reception of mass casualties from a distant conflict or disaster in Maryland.
3. Test the process of activation of the NDMS using voice, data (TRAC2ES) (FRED), (WEBEOC) and information management systems and Field Forward Deployable Medical Treatment Facility (FFDMTF) (TATRC) in response to an OCONUS MASCAL incident.
5. Meet Annual MEDCOM NDMS and External JCAHO Exercise Requirements.

Exercise Design

The exercise was designed to address the four exercise objectives. The functional field exercise focused on the reception, triage, and transport of 160 notional patients and one notional dog, by activation of the NDMS system and application of NIMS ICS. Among these 160 patients were 20 moulaged live patients who were run through flight transport to BWI, reception, triage, staging and transport to Maryland NDMS hospitals. Triage tested both the Forward Deployable Digital Treatment Facility (FDDMTF) supported by TATRC and WRAMC and BWIFRS tents and an Air beam tent. After de-planing of 10 live MASCAL, a break in the FX was used for a debriefing, before re-starting of the FX and de-planing the remaining 10 live MASCAL. A 'Hotwash' debrief followed conclusion of the FX and included reporting by the FX evaluators and all section leaders in the FX.

Logistics

- O/A 20 May, 2006 a 1 day limited scale NDMS Functional Exercise was conducted at BWI Thurgood-Marshall Airport with The State of Maryland Emergency Management Agencies, BWI Administration, VISN-5, TATRC and WRAMC FCC to test NDMS PRA Establishment, Operations and medical regulation to NDMS hospitals. .A Key task was to establish a Unified Command

FX AFTER ACTION REPORT
Airport, Academia, Industry, Military, State (AAIMS) Consortium NDMS Functional Exercise (FX)
Patient Reception Area at BWI with Maryland Agencies, VISN-5, TATRC, WRAMC and WRAMC FCC personnel.

- The overarching goal was successful NDMS patient reception, triage, regulate and accountability for 160 (140 notional patients, 20 moulaged "live" patients) through BWI PRA Site to WRAMC, VA and State of Maryland NDMS Hospitals. Goal: 100% patient accountability and In-transit patient visibility.

Exercise Scenario

- Military Treatment Facilities and US Based Veteran's Administration (VA) hospital systems are at 100% occupancy rate with minimal bed expansion capability remaining. TOPOFF OPNS restricts further Andrews Air Force Base Patient Reception Center use. An OCONUS MASCAL incident occurs in Baghdad, IRAQ as a result of a DFAC suicide bomber attack - resulting in 160 non-CBRN casualties. GPMRC and LARMC Command indicates patients are expected to arrive WRAMC within 24 hrs.

- WRAMC Commander/ FCC Director initiates DOD/VA sharing agreement to shift 20 patients to VA hospitals in order to receive 40 incoming patients. Further patient cross-leveling and over flight permission is restricted per MEDCOM and OTSG. OASD(HA) is approving authority. CONUS PI restricts in-bound patient movement.

- WRAMC Commander/FCC director requests through channels that WRAMC NDMS FCC and TATRC FFDMTF be activated to support Military Contingency Patient Reception Operations at Baltimore Washington Thurgood-Marshall International Airport.

- Activate NDMS MOU with BWI Thurgood-Marshall Airport and State of Maryland Agencies, VISN-5, TATRC and WRAMC FCC to test NDMS PRA Establishment, Operations and medical regulation to NDMS hospitals in Maryland.

Evaluation Methodology

Data Collectors/Evaluators were recruited from those involved in the FX planning process. The data collectors were briefed on the exercise and asked to comment and recommend any changes to the evaluation tools. On the day of the exercise the data collectors were given instructions, a radio, clip board, audio recorder to record debriefing comments and the data collection instrument that applied to the function they were to evaluate. The data collectors documented their findings and the data collection instruments were returned upon completion of the exercise. The data collectors gave a summary of their findings at the "Hotwash" immediately after the FX finished and were then instructed to submit a brief narrative of their observations and any

recommendations. WEB EOC was completed in real-time during the FX. Multiple sites were video recorded using a mobile wireless device that provided coverage of the entire FX and these images were displayed and their usefulness evaluated in the BWI Fire and Rescue EOC.

Summary Exercise Findings by Task

TASK 1. Exercise Planning, Coordination and Evaluation
Conduct the exercise in concert with the DHS Homeland Security Exercise and Evaluation Program (HSEEP). Methodically plan the events and scenario based on the objectives and desired outcomes. Evaluation should be objective and aimed at judging the success of the exercise as a measure of achievement of the stated objectives.

Observations
- Designate evaluation lead (and committee)
- Provide opportunity to recruit subject matter experts
- Train and develop data collection instruments in conjunction with planning committee
- Instruments should follow HSEEP protocol

Recommendations

1.4   Training and Education should occur among NDMS participants: Joint training opportunities should be conducted on key topics such as ICS basics, civilian/military terminology and nomenclature, COP (Common Operating Picture).

1.5   Establish a joint training team to conduct educational opportunities, Certifications and equipment familiarity

1.6   Establish a Training, Education and Evaluation Working Group that would recommend training, education and development of evaluation data collection instruments (following HSEEP protocols) and recruit subject matter experts in conjunction and in parallel with the Planning Committee for future NDMS Exercises.

Task 2 Communication
Effectively communicate information about each patient and for coordination of activities

Observations
- No communication with the Command Post
- Red Tent personnel confused about what was going on

- Red Tent had no way of communicating with other tents ()
- Difficulty sorting out various radio frequencies
- EMS unaware that patients in the OASIS tent were ready for transport(UMMC patients waiting on floor of OASIS ~ entire exercise)
- Scenario confusion (HAZMAT team were told they were receiving hurricane patients with exposure to fecal matter)
- Triage nomenclature, terminology different use by civilian and military
- Radios: Better coordination is required to identify various agencies radio and frequency capabilities and limitations.
- Networking/Automation: Prior coordination for Network administrators to support various disaster agencies. Develop mechanism to support this action where prior planning is not feasible.
- EMS could not get information that FDDMTF patients were ready for transport

Recommendations

2.5 The ICS Communications plan (ICS Form 205) should be completed to define radio type, frequencies and interoperability and to whom (Role) each of these radios is allocated. This should be disseminated with the Incident briefing (ICS201) , organizational chart (ICS207) and incident maps (ICS 202)

2.6 Inter Operability of communications between military and civilian entities is essential and should be immediately obtained e.g., by technology or sharing of a common radio frequency.

2.7 Personnel in the triage tents must be able to communicate with the Incident Command Post, each other, and with Staging , Transport and NDMS receiving Hospitals.

2.8 Information technology, imaging networks and technical support should be made available for EOC's and Incident Command Posts by preplanning system architecture to support disasters. The recommendation includes establishment of a Working Group (WG2) to determine both a mechanism to support a planned coordination of access by various approved agencies and a mechanism to support this action where prior planning is not feasible or additional entities need access.

Task 3 - *Patient Triage & Treatment*
Working with medical attendants on the aircraft, quickly remove the patients and transport them to the Triage group location for cursory evaluations and sorting to treatment areas. Three methods of removing patients and transporting them to the Triage Group. (Hand Carry, Ambulance, Bus) Time motion studies are to be conducted to evaluate the most efficient means.

Observations

- Took 30 min. to take 12 patients off plane

- Information in medical records were inadequate
- No triage tags or improper tagging
- Tagging was done on plane as well as in triage tents
- Medical record for dog in cage
- Patient administrator (PAD) & triage person need to coordinate to avoid reduplication of effort
- One patient not accounted for
- OASIS provide excellent care and treatment of patients (2 min per pt)
- Contaminated patients improperly deplaned
- No hazard evaluation of plane prior to approach
- There were no medical personnel traveling on the aircraft with the patients
- Patients should have tags

Recommendations

3.3   For NDMS Patients arriving at BWI, the patients/casualties should be immediately de-planed, then triaged, tagged, and treated with coordination of activities between the Patient Administrator (PAD) and Triage personnel.

3.4   From information gathered from video documentation, conduct time/motion studies and consider with patient/provider safety to determine safest/most efficient method to move patients.

Task 4 - Patient Transportation and Tracking
Upon stabilization , transport patients to designated facilities as planned by the State EMS Medical Director and Chief Military Medical Authority and adequately track the transporting units, destination and assigned medical care devices for later follow-up or retrieval

Observations

- Patient Gurney Civilian v. litter (military stretcher) Small wheels v. big wheels.
- Litters/Backboards: Joint civilian/military familiarization training needs to occur. Military Litters do not fit into civilian ambulances. Both parties need training.
- PMI Accountability: Patient Movement Items need to be tracked. There is usually an inverse relationship built over more patients to less equipment accountability and hence availability. Establish a working group to solve this issue.

Recommendations

a.   Joint civilian/military familiarization training is recommended to transfer patients from military litters, that do not fit into civilian ambulances. Additional purchases of litter backboards and stretcher innovations should be considered to facilitate this transfer and allow faster movement of patients.

b.   Triage tagging, Patient Movement Item (PMI) and Equipment tracking and accountability should be improved to ensure 100% compliance with Triage tags,100% PMI accountability and 100% return of equipment used in

MASCAL to source of distribution. This recommendation includes
establishment of a Working Group(WG1) to solve these issues.

Task 5 Command Post
Establish a command post with adequate resources to be able to conduct operations over an extended period

Observations
- Too many people made it difficult to hear and or keep up with information flow
- Video was useful
- Minimal technical support available
- Provide name plates
- Headsets to minimize noise

Recommendations
5.4 The new NIMS Organizational Chart developed for the exercise should be backed-up by a standard operating guideline (SOG) for the positions identified. This guideline should briefly identify the position's responsibility.

5.5 The NIMS Chart, SOG and IAP should be incorporated into one document to provide guidance for future tabletops, field exercises or actual events.

5.6 Incident Command should receive real-time information from BWI flight control (as was done in July 2006 for the repatriation of over 3,000 evacuees from Lebanon).

Task 6 - Decontamination
Although it is unlikely that there would be any contaminated patients loaded on the aircraft from crews were to decontaminate one patient to determine how the contingency would affect the flow of operations

Observations
- Have additional fuel on hand for the water heater
- Consider a bladder for larger operations
- Funding for full gear in order to receive full training value from exercises
- Better communication regarding scenario in order to plan appropriate response
- Use another EMS team for medical surveillance to ensure safety
- PPE should be standardized
- Stretchers should be used to transport patients to decontamination tent
- Remove contaminated clothing to protect medical personnel

Recommendations
6.1 BWI Fire and Rescue Service should have Decontamination (DECON) and Isolation facilities and the resources to provide PPE and training to manage decontamination of large numbers of patients

Task 7 FDDMTF
Erect and test the utility of the Forward Deployable Digital Medical Treatment Facility (FDDMTF)

Observations
- Should establish isolation tent for patients with amputation
- FDDMTF functioned well and triage was efficient, the FDDMTF asset was invaluable for MASCAL reception
- Civilian EMS could use FDDMTF when other resources were unavailable

Recommendations
7.1   Establish the correct procedures and approval process for civilian MASCAL use of FDDMTF

Task 8 - Veterinarian
As with decontamination, NDMS reception should not include animals. In order to investigate the impact of this contingency one "dog" was included in the patient list and veterinarians and representatives from the Department of Agriculture were to evaluate the patient and make arrangements for disposition

Observations
- List of veterinary hospitals needed in vicinity of BWI
- List of military veterinary hospitals
- List of supplies needed to transport animals to hospitals
- List of animal transporters to move animals from BWI to respective vet hospitals in quarantined facilities
- List of medical veterinary equipment needed
- Designated animal exercise area at BWI

Recommendations
8.4   There should be a listing of veterinary hospitals in vicinity of BWI and of military veterinary hospitals with contact information.

8.5   There should be supplies, equipment and transport to move animals from BWI to respective vet hospitals in quarantined facilities.

8.6   Designated animal exercise areas are needed at BWI.

Task 9 - Assure Safety
Ensure that all exercise participants, observers, and evaluators can complete their tasks in a environment free from the risk of injury. Adequately monitor the activities and personnel to prevent an action that could be deemed unsafe.

Observations

- Red, Yellow and Green tents not staked down adequately for wind
- Patients not properly secured to backboards
- Triage of patient potential "real life" problem
- No gloves in tent for triage personnel
- Personnel Accountability Report (PAR): We need to do a better job of incorporating PAR into our exercises.
- No one available to "spot" ambulances while backing up
- Disposable ear plugs for all participants
- Provide hearing protection for safety of participants
- Secure tents for potentially windy conditions
- Hazard evaluation should occur prior to off-loading

Recommendations

9.1 Safety specialists should be gathered to re-evaluate all the hazards of operating within the confines of an active airfield and develop a safety plan for future exercises or operations.

Task 10 - Supplies & Equipment

Provide for adequate equipment, shelter and supplies to care for the expected number of patients and providers

Observations

- Tents: BWIFRS should receive additional triage tents to support contingency operations outside of normal response stock.
- Soft goods/Class VIII Medical Supplies: There needs to be an on-scene medical supply cache necessary to support first responder and initial re-supply that is house in ready deployable plastic containers.

Recommendation

10.3 BWI Fire and Rescue Service should obtain additional Triage tents that are more substantial than those used in the exercise, modeled on the FDDMTF, that can be adequately staked down and have protection in austere conditions.

10.4 A Soft Goods/ Class VIII Medical Supplies Cache should be on-scene, housed in readily deployable plastic containers at the triage site to support first- responders and provide initial re-supply

Task 11 - Reception at NDMS Hospital

Transport the patients to 4 hospitals and make initial contact with the hospitals to confirm receipt of specific patients and begin to establish individual care plans

Observations

- Difficulty with Army bus off-loading and unfamiliar with Army litters at civilian hospitals
- No contact was made with the hospitals to arrange the monitoring of care
- All exercise activity was halted before the contact could be made to the hospitals.

Recommendations

11.1   Prepare a patient follow-up plan with input form the hospitals and WRAMC FCC, educate all involved personnel and design next exercise to ensure that patient follow-up does not get negated.

Task12 - Media and VIPs

Observations

- Develop protocol for working with group to keep from impeding exercise flow
- To avoid confusion , during an exercise , information should be disseminated through the same agencies that would be the lead PIO in the 'real-world' incident
- Difficult to access the patient due to photographers and VIPs

Recommendation

12.1   Gather the associated PIOs to review and familiarize themselves with the current Media Plan for BWI and research the best method to allow media additional access during an exercise without interference with exercise flow.

After Action Report (AAR)
Wednesday-Thursday, 5/17-18/2006

Objective: Activation of VA-DOD Contingency including Network-wide participation

Scenario: Military casualties are due from abroad and are too numerous for military resources to accept. Bethesda Naval MC cannot accept patients due to USS Comfort mobilization. VA-DoD Contingency and NDMS is activated to accept patients. VISN coordinates Washington VAMC VA-DoD Contingency support to Walter Reed, in addition to VAMHCS. The VA-DoD portion of this exercise is a small footnote of a larger MD-wide NDMS patient distribution exercise.

\\Vhawasfpc18\
share\Emergency Mai

Abilities Exercised: The following activities were exercised:

- Use of Trac2es for bed reporting accessing patient manifest.
- VISN Coordination of VISN-Wide exercise
- Medical/Nursing assessment of patients for Discharge/Transfer
- Discharge/Transfer coordination between Case Manager, SWS, Bed Coordinator and Business Office to increase bed availability
- Transportation planning, particularly for our patients that required Critical Care Transportation (CCT).

Benefits: The exercise participants felt it was a realistic drill that had similar functions in other emergencies. **(Mass Evacuation and Mass Casualty emergencies)**

AARs are forwarded the Medical Center Director to approve and require the listed actions be implemented. Each action is listed under one of the following Key Functions/Activities:

Key Functions/Activities:

BC	Business Community (liaison)	LG	Logistics
CC	Command & Control (& structure)	OP	Operations (clinical support)
CM	Communication	PA	Public Affairs & Information
DR	Drill Planning	PI	Planning, Intelligence (& EMOP)
FA	Finance & Admin	PU	Plant & Utilities
HM	Health & Medical (pt. care)	SS	Safety & Security
IT	Info. Technology	TR	Training
KD	Kudos / Worked well		

Priorities (P):

- **0** **Not** a priority
- **1** **High.** Plan will not function properly without addressing problem.
- **2** **Med.** Plan will function but not effectively.
- **3** **Low.** Plan functions OK without the improvement.

VA-DoD Contingency Exercise

Priority #	Item & Description	Actions	Responsible	Due Date	Date Done	Approved by Director (initial)
PI-01 / 2	**Brief Multidiscipline Checklists:** The VA DoD plan lacked detailed guidance for mass transfer/ discharge/ admission under the DoD scenario, leading exercise participants to develop processes during the response. Such checklists will ensure more efficient process and will be transferable Evacuation Plans as well as VA-DoD Contingency.	1. **Develop Checklists.** Each primary role (Transportation, Admission Coord., Case Mgr, Attending MD, COS) should develop a complete bullet checklist for their part of the discharge/transfer and incoming planning process. 2. **Update Plans.** Integrate the above checklists into the appropriate emergency plans (ICS, VA-DoD, Evac., others).	Medicine, SWS, Surgical, COS, Admissions, & Nursing EPC, Emergency Management Subcommittee	6/30/06 8/18/06		
PI-02 / 1	**Discharge-Transfer Coordinator:** Discharge and transfer of patients was being planned and implemented throughout the wards by Case Managers and Attending MDs, however, there was not a person coordinating all the patients leaving the facility. Under our ICS Plan, the Patient Tracking Coordinator would have this role. The Admissions Coord/ Pt. Tracking Coord. felt that the tracking and coordinating incoming vs. outgoing patients is sufficiently unique to justify a separate assigned role. Additionally, the exercise team determined that this position, under some circumstances might require clerk/assistants.	1. **Establish Discharge-Transfer Coordinator Role.** Design a new role entitled "Discharge-Transfer Coordinator", with responsibility to coordinate with all affected Nursing Case Managers, Social Workers, Transportation, and Admissions and to track patients as they are transported to other facilities. 2. **Update Plans.** Establish and integrate this new role into the appropriate emergency plans.	Nursing & Admissions, EPC, Emergency Management Subcommittee	6/30/06 8/18/06		
IT-03 / 2	**Patient Transport Record:** In emergency transfers an abbreviated patient medical record is needed for transporters and the receiving facility until full patient records are available.	1. **Establish Patient Transport Record.** Establish the minimum contents needed in a PTR and work with IRMS to define how such a pre-determined medical record could be readily printed as needed during various emergency scenarios. 2. **Update Plans.** Establish and integrate this new feature into the appropriate emergency plans.	Nursing Informatics, IRMS & COS EPC, Emergency Management Subcommittee	7/30/06 9/18/06		

VA-DoD Contingency Exercise

#	Priority	Item & Description	Actions	Responsible	Due Date	Date Done	Approved by Director (initial)
IT-04	1	**Full CPRS Record Access in Emergencies:** Critique discussion led to consideration of other emergency transfer/discharge scenarios such as evacuation. During an evacuation, remote access to the full CPRS record would be required. During Katrina, Gulfport and New Orleans VISTA Systems went down. IRMS Teams set up new VISTA servers and using back-up tapes, and restored VISTA records access. VHA it working toward centralizing active back-up patient data. Plans are underway which will provide live mirror sites throughout VHA, and VISN 5 should have this in place in 2008.	**Bring VPN-equipped laptops for full patient evacuations to private hospitals.** Develop additions to current evacuation plans whereby laptops will be taken to private destination hospitals to allow CPRS access to patient records at the receiving hospital.	Nursing, IRMS	7/30/06		
CC-01	2	**Administrative Record of Events:** A time line is established during an event and all actions taken are recorded.	**Recommend an electronic activity log for use in the ECC as the chronological event log.** This will allow easy identification or sharing/transfer of information as needed. Example at T:\Emergency Management\EMSHG VISN 5\Programs-Topics\Exercises\AAIMS VA-DOD\ECC Activity Log.xls	Administrative Support Staff for Front Office.	N/A	N/A	

Prepared by:

Approved and Ordered:

_____ Date _____
Robert Carnevale
Emergency Preparedness Coordinator
FMS/ Safety Office

_____ Date _____
Sanford M. Garfunkel
Medical Center Director

c:\documents and settings\skatumuliuwa\desktop\aaims work\final report docs\appendices\va-dod aar.doc
10/23/06

3

APPENDIX 10

AAIMS CPX 20May06

-Incident Log-

dataid	incidentid	userid	positionid	prevdataid	entrydate	date_time	Name	Originator	Event_Type	Description	Priority
107	226	892	0	0	2006-05-20T11:20:57.670	2006-05-20T11:17:00	Terry Thompson		Mass Casualty		Routine
108	226	892	0	0	2006-05-20T11:24:58.607	2006-05-20T11:21:00	Terry Thompson		Mass Casualty	*****THIS IS AN EXERCISE******** In the Command Post @ BWI Fire Department	Routine
109	226	59	6	0	2006-05-20T11:49:12.623	2006-05-20T10:57:00		MIEMSS-FRED		EXERCISE ONLY - Patient manifest has been faxed out to , Southern Maryland, UMMC, St Agnes, and Doctors	Routine
113	226	892	0	0	2006-05-20T13:21:52.013	2006-05-20T13:18:00	Terry Thompson		Mass Casualty	EOC Briefing Taking Place---MIEMMS;BWI airport staff;Maryland Transportation Authority Police;MilitaryBWI Operations; Staffing the EOC	Routine
114	226	59	5	0	2006-05-20T13:31:43.390	2006-05-20T13:27:00	GDZ		Mass Casualty	Zour & Hamilton monitoring WEBEoc entries.	Low
115	226	892	0	0	2006-05-20T13:52:23.500	2006-05-20T13:44:00	Terry Thompson		Mass Casualty	EOC Briefing completed; Unified Command in place	Routine
116	226	59	6	0	2006-05-20T14:01:35.233	2006-05-20T14:00:00				At REQ MIEMSS; ETA established for flight MTN->BWI. Contact with Warfield CP reports aircraft 2min to take off.	Routine
117	226	892	0	0	2006-05-20T14:03:00.077	2006-05-20T14:00:00	Terry Thompson		Mass Casualty	Been advised that the C-130 will be departing Martins in about one minute; Travel time to BWI 20 minutes	Low
118	226	892	0	0	2006-05-20T14:12:44.577	2006-05-20T14:11:00	Terry Thompson		Mass Casualty	C-130 Has arrived at BWI	Critical
119	226	892	0	0	2006-05-20T14:16:14.483	2006-05-20T14:12:00	Terry Thompson		Mass Casualty	C-130 on the ground in position for unloading of the patients	Routine
120	226	892	0	0	2006-05-20T14:21:43.280	2006-05-20T14:16:00	Terry Thompson			Triage teams are now at the aircraft; Images of the actual site are being sent back to the command post	Routine
121	226	892	0	0	2006-05-20T14:30:23.047	2006-05-20T14:29:00	Terry Thompson		Mass Casualty	Triage teams are on the aircraft evaluating the patients at this time	Routine
123	226	892	0	0	2006-05-20T14:35:49.280	2006-05-20T14:34:00	Terry Thompson		Mass Casualty	Patients are now being removed from the aircraft	Routine
124	226	892	0	0	2006-05-20T14:41:45.187	2006-05-20T14:39:00	Terry Thompson		Mass Casualty	One patient has been taken to the DCON tent; also loading other patients on the transport bus to be taken to the triage tent	Routine
										Two patients in the D-Con tent; 50% of the	

APPENDIX 10

126	226	892	0	0	2006-05-20T14:53:28.937	2006-05-20T14:50:00	Terry Thompson	Mass Casualty	patients have been loaded on the ambulance bus and will be transported to the triage tent; the other 50% of the patients are still on the aircraft with a triage team	Routine
127	226	892	0	0	2006-05-20T15:05:45.217	2006-05-20T15:03:00	Terry Thompson	Mass Casualty	Exercise has been pause to evaluate the first phase of the exercise	Routine
128	226	892	0	0	2006-05-20T15:08:15.420	2006-05-20T15:06:00	Terry Thompson	Mass Casualty	Doing debrief on the first half of the exercise; will be resuming the exercise in five minutes	Routine
129	226	892	0	0	2006-05-20T15:09:41.170	2006-05-20T15:08:00	Terry Thompson	Mass Casualty	Two patients have been prepared for transport to medical facility	Routine
130	226	892	0	0	2006-05-20T15:13:37.950	2006-05-20T15:12:00	Terry Thompson	Mass Casualty	Exercise is starting up again	Routine
131	226	892	0	0	2006-05-20T15:16:24.983	2006-05-20T15:14:00	Terry Thompson	Mass Casualty	Patient being prepared for transport by MSP Medivac; Medivac on location awaiting patient	Routine
132	226	892	0	0	2006-05-20T15:21:22.043	2006-05-20T15:19:00	Terry Thompson	Mass Casualty	Critical Patient is being moved to the the Medivac at this time	Routine
133	226	892	0	0	2006-05-20T15:31:32.450	2006-05-20T15:30:00	Terry Thompson	Mass Casualty	All patients have been removed from the aircrat	Routine
134	226	892	0	0	2006-05-20T15:39:32.327	2006-05-20T15:37:00	Terry Thompson	Mass Casualty	MSP Medivac has transported to Shock Trauma (patient was not actually transported MSP)	Routine
135	226	892	0	0	2006-05-20T15:43:30.967	2006-05-20T15:41:00	Terry Thompson	Mass Casualty	Exercise was paused and has started back up	Routine
136	226	892	0	0	2006-05-20T15:52:10.513	2006-05-20T15:49:00	Terry Thompson	Mass Casualty	Correction to earlier update two patient were not transported; 18 patients have been traige; 2 patients were D-CON; One patient was simulated to be transported by MSP Medivac: Total of 20 Patients;	Routine
137	226	892	0	0	2006-05-20T16:01:45.700	2006-05-20T16:00:00	Terry Thompson	Mass Casualty	Hotwash will take place @ 13:00 @ the fire station	Routine
138	226	892	0	0	2006-05-20T16:14:28.140	2006-05-20T16:11:00	Terry Thompson	Mass Casualty	Four patients transported to St. Agnes///1 P1 pt.////3 P3 pts.	Routine
139	226	892	0	0	2006-05-20T16:27:57.967	2006-05-20T16:24:00	Terry Thompson	Mass Casualty	six patients being transported to University by bus; four patients to Southern Md. Hospital (Waldorf); two patients to Doctors (Private) and 2 patients to Doctors (Grasonville)	Routine
140	226	892	0	0	2006-05-20T16:32:34.200	2006-05-20T16:29:00	Terry Thompson	Mass Casualty	Weather event coming in; 27 mph winds; will start to	Routine

77

APPENDIX 10

									take the tents down
141	226	892	0	0	2006-05-20T16:52:32.780	2006-05-20T16:49:00	Terry Thompson	Mass Casualty	Walter Reed Bus transported 5 P2 & 1 P1 to University Hospital///Waldor's Ambulance transported 1 P1, 2 P2, 1 P3 to Southern Maryland Hospital////Grasonville transported 2 P2 to Doctors Hospital and a private ambulance transported 2 P2 to Doctors Hospital	Routine
154	226	249	15		2006-05-21T19:05:01	2006-05-21T19:02:00	sraver	Utility Emergency	ALL LANES ARE CLOSED FOR WIRES DOWN FIREBOARD AND MSP ON SCENE 1430 HOURS 900 NOTIFIED 4500 NOTIFIED	Medium
	226	249	0	0	2006-05-21T20:22:00	2006-05-21T20:00:00	sraver	Utility Emergency	ALL LANES ARE CLOSED FOR WIRES DOWN FIREBOARD AND MSP ON SCENE 1430 HOURS 900 NOTIFIED 4500 NOTIFIED ALL LANES OPEN 1615	Low
156	226	249	0	155	2006-05-21T22:07:240	2006-05-21T22:40:00	sraver	Road Closure	ALL EAST BOUND FOR A MISSING MANHOLE COVER AND UNIT. POLICE ON SCENE NOTIFIED 4601	Medium
	226	249	0	155	2006-05-21T23:22:23.460	2006-05-21T23:40:00	sraver	Road Closure	ALL LANES CLOSED EAST BOUND FOR A MISSING MANHOLE COVER AND UNIT. POLICE ON SCENE NOTIFIED 4601	Medium
	226	249	0	0	2006-05-22T01:44:16.340	2006-05-22T01:40:00	sraver	Road Closure	ALL LANES CLOSED EAST BOUND FOR A MISSING MANHOLE COVER AND UNIT. POLICE ON SCENE NOTIFIED 4601 ALL LANES OPEN 2030 HOURS	Low
152	226	249	0	161	2006-05-22T14:16:41.590	2006-05-22T14:15:00	gwilken		SERIOUS ACCIDENT US 50 AT AIREYS RD. ALL LANES CLOSED W/B SIDE AND LEFT LANE IS CLOSED E/B SIDE	Immediate
	226	249	0	0	2006-05-22T15:13:44.250	2006-05-22T14:15:00	gwilken		ALL LANES OPEN US 50 AT AIREYS RD	Routine

78

INCIDENT OBJECTIVES	1. Incident Name NDMS Patient Reception	2. Date 5/20/06	3. Time 0800

4. Operational Period

6 hours

5. General Control Objectives for the Incident (include alternatives)

1. Incident Briefing to explain objectives
2. Establish Patient Reception Area as per plans
3. Safely land Aircraft
4. Identify patient according to patient panifest
5. Identify changes in triage status
6. Dplane and move patients to Recepion Area
7. Provide additional stabilization
8. Load patients into Transport Vehicles according to receiving hospital
9. Transport to Agreed upon hospital
10. Contact Hospital to verify Receipt

6. Weather Forecast for Period

Partly Cloudy 73 o Light winds Expected

7. General Safety Message

Watch for rough Terrain

Make sure you have adequate bearers for the litters

8.   Attachments (mark if attached)

☒ Organization List - ICS 203   ☐ Medical Plan - ICS 206   ☐ (Other)

☐ Div. Assignment Lists - ICS 204   ☒ Incident Map   ☐

☒ Communications Plan - ICS 205   ☒ Traffic Plan   ☐

9. Prepared by (Planning Section Chief)

10. Approved by (Incident Commander)

ICS 202

INCIDENT BRIEFING	1. Incident Name NDMS Patient Reception	2. Date 20 May 06	3. Time 0700

4. Map Sketch

1. C-130
2. MSP Trooper
3. Triage
4. Immediate- VSI
5. Communication
6. Urgent
7. Delayed
8. Decontamination
9. Operations Section
10. Porta Potties
11. Transportation Unit
12. Gate
13. Stop Point

→ Hot Line

→ Access

→ Egress

Security Line
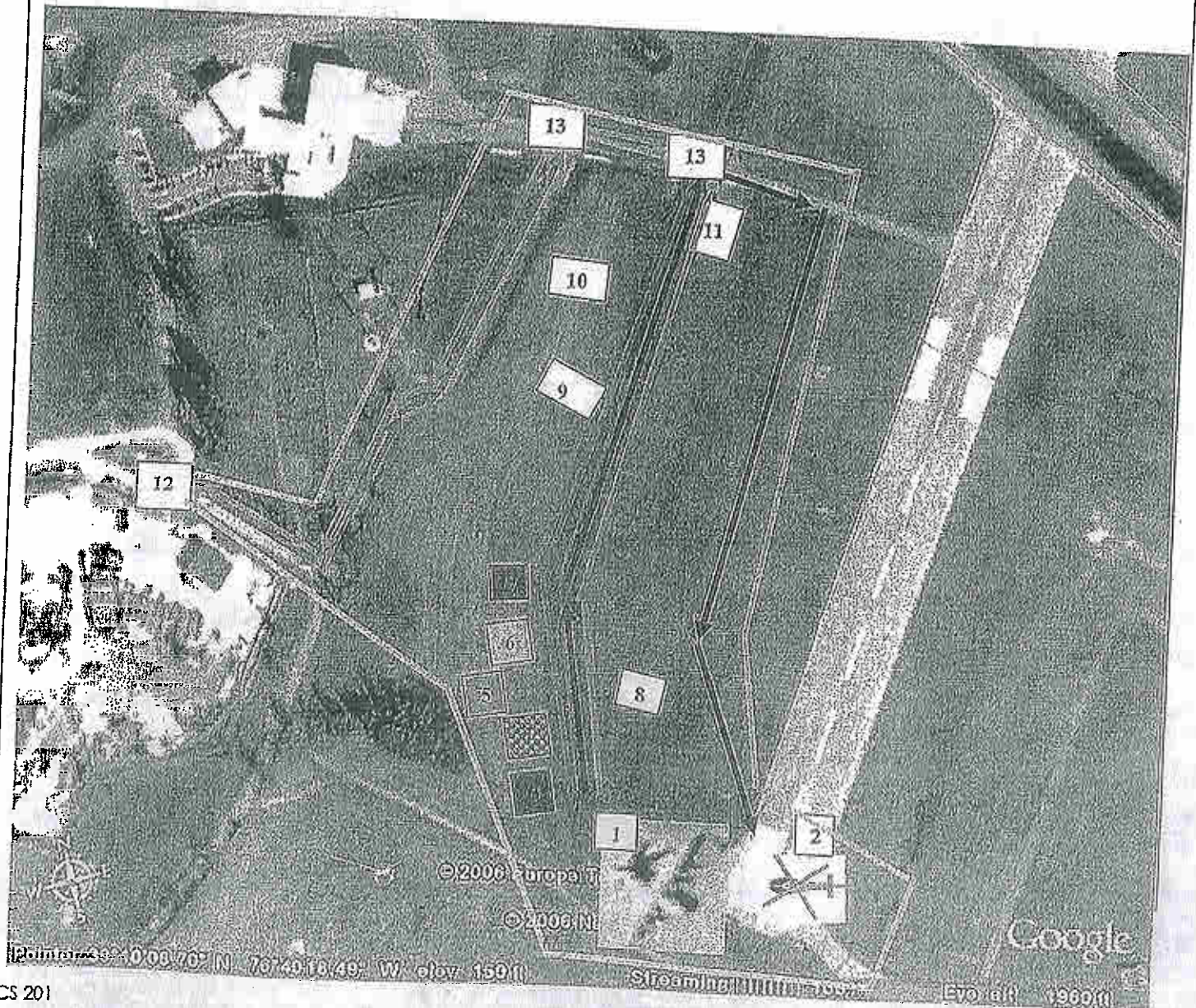
5. Current Organization

**Maryland NDMS Reception Plan
Command Structure**

Ver 4 12/16/05

6. Prepared by (Name and Position)

Page 2 of 3

81

UNIT LOG	1. INCIDENT NAME NMDS Drill **Page 1**		2. DATE PREPARED My 22. 2006	3. TIME PREPARED 0935-1400
4. UNIT NAME/DESIGNATORS Unified Command Post	5. UNIT LEADER (NAME AND POSITION) D/C Pace		6. OPERATIONAL PERIOD May 20.	

7. PERSONNEL ROSTER ASSIGNED

NAME	ICS POSITION	HOME BASE
D/C Pace	Unified command	BWI FRD
R Megan	Unified command	MIEMSS
Sgt Volz	Unified command	MTAP
Col Griffen	Unified command	WRMC
Terry Thompson	Planing	MEMA
D/C Kirkpatrick	Unified command	BWI FRD

8. ACTIVITY LOG (CONTINUE ON REVERSE)

TIME	MAJOR EVENTS
1000	Aircraft leaves MTM Airport
1012	Aircraft on location
1050	2 patients at decon, 4 patients at triage tent, others being triaged on the aircraft
1100	Pause for evaluation
1110	Update from ops: 50% triaged, 2 ready for transport Transportation officer working out of Nat Guard/MEMA trailer
1110	Resume exercise
1130	All patients on aircraft triaged, all patients moved to the treatment tent.
1135	18 patients triaged all in treatment one transported by helo
1135	Pause for evaluation
1140	Resume exercise
1155	Fire dept PAR all accounted for

ICS 214

82

UNIT LOG	1. INCIDENT NAME NMDS Drill **PAGE 2**	2. DATE PREPARED My 22. 2006	3. TIME PREPARED 0935-1400
4. UNIT NAME/DESIGNATORS Unified Command Post	5. UNIT LEADER (NAME AND POSITION) D/C Pace	6. OPERATIONAL PERIOD May 20.	

7. PERSONNEL ROSTER ASSIGNED

NAME	ICS POSITION	HOME BASE
D/C Pace	Unified command	BWI FRD
R Megan	Unified command	MIEMSS
Sgt Volz	Unified command	MTAP
Col Griffen	Unified command	WRMC
Terry Thompson	Planning	MEMA
D/C Kirkpatrick	Unified command	BWI FRD

8. ACTIVITY LOG (CONTINUE ON REVERSE)

TIME	MAJOR EVENTS
1205	Briefing held update 4 patients to St Agnes AACO PM 21 Balto Co PM 5 (3) priority 3 (1) priority 1
1215	Waldorf Ambo to Southern MD Hospital 4 patients (1) priority 1 (2) priority 2 (1) priority 3
1220	Grasonville Ambo and Taylor Ambo to Doctors Hospital (4) priority 2 Weather update wind gust 27 MPH out of the west
1245	Walter Reed bus to University Hospital (5) priority 2 (1) priority 1
1245	Ops section demobilized Command terminated

ICS 214

8. RESOURCES SUMMARY

RESOURCES ORDERED	RESOURCES IDENTIFICATION	ETA	ON SCENE *	LOCATION/ASSIGNMNET
	AACO PM 21		0900	Transportation
	Balto. Co PM 5		0900	Transportation
	BWI PM 43		0900	Transportation
	WRMC Bus		0900	Transportation
	Waldorf Ambo		0900	Transportation
	Grasonville Ambo		0900	Transportation
	Private Ambo		0900	Transportation
	BWI Eng 43		0900	Litter Bearer
	Balto Co Eng 5		0900	Litter Bearer
	Balto Co Eng 41		0900	Litter Bearer
	Balto Co Eng 263		0900	Litter Bearer
	Tower 43		0900	Hazmat Decon
	BWI PM 43		0900	Standby

ICS 201 (12/93) NFES 1325	PAGE 4	

INCIDENT RADIO COMMUNICATIONS PLAN

1. INCIDENT NAME	2. DATE/TIME PREPARED	3. OPERATIONAL PERIOD DATE/TIME
NMDS Drill	May 20, 2006	May 20, 2006, 0815

4. BASIC RADIO CHANNEL UTILIZATION

SYSTEM / CACHE	CHANNEL	FUNCTION	FREQUENCY	ASSIGNMENT	REMARKS
BWI/FRD	TAC 1	Command		FRD Training Room Unified Command	
BWI/FRD	TAC 2	OPS		Operations BWI Mobile Command Post	
MIEMSS	CH 1	Controllers		Drill Controllers	
WRMC	Ops Channel	Military Medical Ops		Aircraft/ Military Medical Tent	
LEP MTAP	BWI 1	Law Enforcement		Security	

5. PREPARED BY (COMMUNICATIONS UNIT) D/C GM Pace

ICS 205

UNIT LOG	1. Incident Name		2. Date Prepared	3. Time Prepared
	NDMS Drill		05/20/2006	0700
4. Unit Name/Designators	5. Unit Leader (Name and Position)			6. Operational Period
Operation	Amos E Joiner			0700-1900

7. Personnel Roster Assigned

Name	ICS Position	Home Base
Amos E Joiner	Operation Chief	
Lisa Chervon	Medical Group	
Doug Brinkley	Safety	
Linas Saurusaitis	Staging	
Robert Stower	Decon	
Col Lee	Milutry	
Ben Martinez	Airport operation	
Srg Meerdter	Police	

8. Activity Log

Time	Major Events
0700	Set up for drill
0900	Unit in postion
0915	MSP tropperon location
0955	Decon ready
1010	C 130 on ground
1035	All patient decon
1050	Up date command
1100	MEMA bus on location
1130	All patient off plane
1132	MEMA trailer in operation
1155	PAR was done
1300	Drill over

9. Prepared by (Name and Position)

ICS 214

BWI AIRPORT FIRE & RESCUE DEPARTMENT
DUTY ROSTER

DATE: 05-20-2006

A SHIFT

OIC
JOINER HM

ARFF

OFFICER	TOWER 43
GRIBBLE	PLANNER
	HIGGS HM
	BAMBARY HM

RESCUE 431	RESCUE 432	RESCUE 435
STEWART HM	O.O.S.	FRAZER
FAULKNER HM		

RESCUE 436		
TENAGLIS		KP: HOWARD
PHILLPIS HM		KP:
		Dinner: FAULKNER

STRUCTURAL

OFFICER	OFFICER	PM 43
QUINT 43	POORE	SAURUSAITIS
	ENGINE 43	PYLE
	STOWER HM	PM 44
	ALESSI HM	HOWARD
	BRINKLEY HM	BLIZZARD

OFF DUTY

McFARLAND PER	LEWIS SICK
R. SCOTT VAC	BLIZZARD FOR SHORT
McGINNES VAC	LOWMAN SICK
BERG VAC	

UNIT LOG	1. INCIDENT NAME NDMS Drill	2. DATE PREPARED 5/20/2006	3. TIME PREPARED 15:00
4. UNIT NAME/DESIGNATORS Safety Officer	5. UNIT LEADER (NAME AND POSITION) Douglas A. Brinkley	6. OPERATIONAL PERIOD 0800-1400	

7. PERSONNEL ROSTER ASSIGNED

NAME	ICS POSITION	HOME BASE
Douglas A. Brinkley	Safety Officer (1)	BWI Fire-Rescue
Mark Dubell	Safety Officer (2)	Anne Arundel Fire department

8. ACTIVITY LOG (CONTINUE ON REVERSE)

TIME	MAJOR EVENTS
0830	Safety Plan prepared
0900	Safety plan reviewed with Incident Command
0910	Safety plan reviewed with Operations
0915	B.W.I. Fire Rescue Department "A" Shift briefed (decon / ops. Support)
0930	Safety briefing for Mutual Aid Fire Rescue
1000	Haz-Mat situation awareness discussion with Decon team leader
1015	Aircraft Lands
1027	Specific Patients taken to decon
1030	Patients unloaded
1100	Patients unloaded
1115	Patients moved about

ICS 214

UNIT LOG	1. INCIDENT NAME NMDS Drill	PAGE 2	2. DATE PREPARED My 20. 2006	3. TIME PREPARED 1500
4. UNIT NAME/DESIGNATOR Safety Officer	5. UNIT LEADER (NAME AND POSITION) Firefighter Brinkley		6. OPERATIONAL PERIOD 0800-1500	

7. PERSONNEL ROSTER ASSIGNED

NAME	ICS POSITION	HOME BASE
Douglas A. Brinkley	Safety Officer (1)	BWI Fire Rescue Department
Mark Dubell	Safety Officer (2)	Anne Arundel Fire Department

8. ACTIVITY LOG (CONTINUE ON REVERSE)

TIME	MAJOR EVENTS
1130	Patients moved about
1200	Personal Accountability Report asked for,
1205	Companies / Units report P.A.R.
1215	Companies reported to Rehab
1230	Demobilization starts
1300	Demobilization continued
1330	Demobilization continued
1400	Demobilization / Safety briefing and comments at hot wash
1500	Drill ends
	Firefighter Douglas Alan Brinkley, Safety Officer

ICS 214

89

1. BRANCH Operations	2. DIVISION/GROUP Safety Officer	**ASSIGNMENT LIST**

3. INCIDENT NAME NDMS Drill	4. OPERATIONAL PERIOD – DATE/TIME 5/20/2006 0800-1500

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF   AMOS E. JOINER
DEPUTY CHIEF   GARRY PACE
BRANCH DIRECTOR   LISA CHERVON

DIVISION/GROUP SUPERVISOR Amos Joiner

AIR TACTICAL GROUP SUPERVISOR ___N/A___

6. RESOURCES ASSIGNED THIS PERIOD

TASK FORCE RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	TRANS. NEEDED	DROP OFF PT./TIME	PICK UP PT./TIME
Decon	FF Stower	14			
Medical	Lt. Poore	Unk.			
Triage	Lt. Poore	Unk.			
Treatment	MIEMSS	Unk.			
Transport	MIEMSS	Unk.			
Military E.M.S.	Military	Unk.			
Mutual Aid	B.Co., A.A.Co., Q.A.Co. St. Mary's Co.	Unk.			
Airfiel stand-by	B.W.I. FRD	3			

7. CONTROL OPERATIONS

See Operations Assignment List

8. SPECIAL INSTRUCTIONS

In event of a true emergency, air horn blasts will be given for one minute. You will report to the Command post and a P.A.R. will be conducted. If the patients have a "true" emergency, they will hold up a "Red" card. Treat them accordingly, and notify command.

9. DIVISION/GROUP COMMUNICATIONS SUMMARY

FUNCTION		FREQ.	SYSTEM	CHAN	FUNCTION		FREQ.	SYSTEM	CHAN
COMMAND	LOCAL	800 mgz		Tac 2	SUPPORT	LOCAL	800 mgz		Tac 2
	RPT					RPT			
DIV/GROUP TACTICAL				Tac 2	GROUND TO AIR				

PREPARED BY (RESOURCES UNIT LDR.) Firefighter Douglas A. Brinkley	APPROVED BY (PLANNING SECTION CHIEF)	DATE 05/20/06	TIME 1500

ICS 204

INCIDENT ACTION PLAN SAFETY ANALYSIS

1. Incident Name	2. Date	3. Time
NDMS Drill	05/20/06	0800

LCES* Analysis of Tactical Applications
Lookouts Communications Escape routes Safety zones

LCES Mitigations: Safety Officers Positioned over field

Other Risk Analysis / Other Risk Mitigations:
- Aircraft, turbo-prop, loading
- Un-loading patients, lifting,
- Moving vehicles, wires on the ground for T.V., etc.

Category	Mark
Division/Group	X
Location of Assigned Work Site	
Probability of Secondary Collapse	
Environmental Conditions	
Hazardous Materials	
Sanitation / Water	
Public Utilities	
Contingency Planning	
Evacuation Site Location(s)	
Infrastructure Assessment	
Base(s) of Operations	
Hazard Materials	X
Transportation, 1 Hr+	
Communications	X
Structure Protection	

Prepared by (Name and Position)

91

WBAL
wbal.com AM 1090
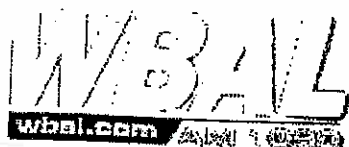
HOMES ARE BE
LESS AFFORDA

FLAGSHIP STATION of THE BALTIMORE RAVENS

Maryland's NEWS · TALK · SPORTS Station

■Dave Durian ■Chip Frankli

Saturday May 20, 2006

Home > Weather

INSTAWEATHER FORECAST FOR BALTIMORE, MD

Top Stories   Audio Highlights   InstaWeather Forecast   Traffic Conditions   Email Alerts

CURRENT CONDITIONS

Baltimore, Baltimore-Washington International Airport, MD

Mostly Cloudy **54°F**	Humidity: 80%	**Sunrise** 5:49 AM EDT	**Moon Phas**
	Wind Speed: CALM		
	Barometer: 29.71 in.		
	Dewpoint: 48°F		
	Heat Index: 54°F	**Sunset** 8:17 PM EDT	Waning Cresce Moon
	Wind Chill: 54°F		

EXTENDED FORECAST
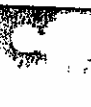
Baltimore, Baltimore-Washington International Airport, Maryland | Updated: 349 AM EDT SAT MA' 2006

SATURDAY	SUNDAY	MONDAY	TUESDAY	WEDNESDA'
Partly Cloudy	Chance Of T-Storm	Mostly Sunny	Mostly Sunny	Partly Cloudy
Hi: 71°F Lo: 49°F	Hi: 71°F Lo: 45°F Precip: 20%	Hi: 69°F Lo: 45°F	Hi: 71°F Lo: 49°F	Hi: 75°F Lo: 55°F

FORECAST DETAILS

Updated: 349 AM EDT SAT MAY 20 2006

Includes the Counties: Frederick County MD, Carroll, Northern Baltimore
Includes the Cities: Frederick, Westminster

- **Saturday**...Partly cloudy. Highs in the lower 70s. West winds 10 to 20 mpl

- **Sunday**...Partly cloudy. A slight chance of showers in the morning... Then slight chance of showers and thunderstorms in the afternoon. Highs in the lower 70s. West winds 15 to 20 mph. Chance of rain 20 percent.

- **Monday**...Mostly sunny. Highs in the upper 60s. Northwest winds 10 to 15 mph.

B.W.I. Fire Rescue Department Safety Officer Checklist

Box: 43-50   Date: 5/20   Time: 1010   Weather: Sunny 74°?

Incident: ND IMS   Location: Echo @ #4

✓ **Protective Clothing in Use**: Helmet, Hood, Gloves, Coat / Pants, SCBA,
Eye / Ear protection, Pass Alarm (proximity)

✓ **Accountability** in Place: at level __1__ Point of Entry: _____

✓ **P.A.R.** for Crews, @ 20 minutes, continuous.

_____ **Primary Assessment:**

___ a. Gas Shut Off @ _____
___ b. Electric Off (LOTO) @ _____
___ c. Overhead wires
___ d. Structure / **Collapse!**
___ e. Exposures (checked)
✓ f. Aircraft Type: __C-130__

_____ **Fire Control:**

✓ a. Crew Integrity
___ b. Back Up Line
___ c. Roof Ops. / Sector
___ d. Ventilation / Meter
___ e. Overhaul (SCBA)
___ f. Ladders / Egress

Hazardous Materials Present: _____

✓ **Hazards:**   Ice   Hoselines   Wires   Structural   Holes   (Arff)

✓ **Rehab:** [Ambulances]   H20 | Hydration Station Alarms |

Diagram:
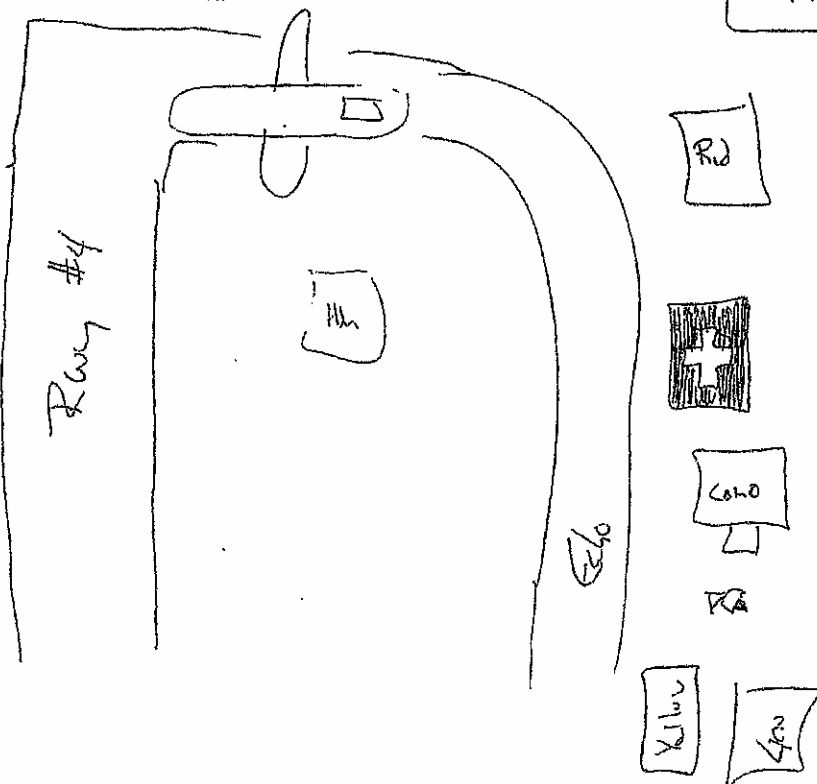
EMS dedicated - ____

P.A.R. - ____

EMS Tent - CO Monitor Fans (heat)

Running Ambi's

SITE SAFETY AND CONTROL PLAN ICS 208 HM	1. Incident Name: NDMS Drill	2. Date Prepared: 05/20/06	3. Operational Period: Time: 1000 hr - 1300

Section I. Site Information

4. Incident Location: E taxi @ Rwwy #4

Section II. Organization

5. Incident Commander: OPS = Pace / Joiner	6. HM Group Supervisor:	7. Tech. Specialist - HM Reference: Bombary
8. Safety Officer: Brinkley	9. Entry Leader:	10. Site Access Control Leader:
11. Asst. Safety Officer - HM: Dubel	12. Decontamination Leader: FF Stowar	13. Safe Refuge Area Mgr:
14. Environmental Health:	15.	16.

17. Entry Team: (Buddy System)

Name:	PPE Level	18. Decontamination Element: Name:	PPE Level
Entry 1	Tyvodr	Decon 1 Stowar	Tyvek
Entry 2		Decon 2 Phillips	"
Entry 3		Decon 3 Alessi	"
Entry 4		Decon 4 Faulkner	"

Section III. Hazard/Risk Analysis

19. Material:	Container type	Qty.	Phys. State	pH	IDLH	F.P.	I.T.	V.P.	V.D.	S.G.	LEL	UEL
Jet A (JP-4)	—	?	liquid									

Comment: off C-130

Section IV. Hazard Monitoring

20. LEL Instrument(s):	21. O₂ Instrument(s):
22. Toxicity/PPM Instrument(s):	23. Radiological Instrument(s): N/A

Comment: - working aquipment

Section V. Decontamination Procedures

24. Standard Decontamination Procedures:

Comment: Water w/ Soap Solution	YES:	NO:

Section VI. Site Communications

25. Command Frequency: Tac 2 Tac 2	26. Tactical Frequency: 2	27. Entry Frequency: N/A

Section VII. Medical Assistance

28. Medical Monitoring:	YES: ✓	NO:	29. Medical Treatment and Transport In-place:	YES: ✓	NO:

Comment: vitals

Safety Message:

Remain Calm, Training Exercise

Emergency: Air Horn blast for 1 minute, report to the Command Post, a P.A.R. will be conducted at that location.

In the event a Patient has a real Emergency they will hold up a **RED** card. Act to the emergency accordingly. Notify Incident Command.

Weather: highs in lower 70's, humidity at 80% overcast,

Keep hydrated, if crews need breaks etc., Unit Officers will follow chain of command... ask for them.

General: Orange fencing is perimeter of play, there is **NO** reason for you to be near the orange fence. Law Enforcement will be positioned at the fence.

Be mindful of jet-blast, keep 200' perimeter from Aircraft. When approaching aircraft, be with a guide.

Safety Equipment:
E.M.S. Gloves
Eye protection
Safety shoes
Helmet

Standard assignment:
Assist in loading, unloading and transporting patients to triage areas and E.M.S. vehicles for proper care.

Haz-Mat: Companies will be conducting decon, follow proper Haz-mat protocols per Haz-Mat OIC.

In the event of an airfield emergency, Mutual Aid equipment will **NOT** self-dispatch. Wait for our Command to ask you or dispatch you for assistance.

	1. INCIDENT NAME	2. DATE PREPARED	3. TIME PREPARED
UNIT LOG	NDMS Drill	5/20/2006	10:40
4. UNIT NAME/DESIGNATORS Decon	5. UNIT LEADER (NAME AND POSITION) Robert Stower	6. OPERATIONAL PERIOD 0700-1900	

7. PERSONNEL ROSTER ASSIGNED

NAME	ICS POSITION	HOME BASE
Heather Phillips Hazmat Tech	Decon	BWI
Robert Stower Hazmat Tech	Decon	BWI
Chas Alessi Hazmat Tech	Decon	BWI
Emmanuel Faulkner Hazmat Tech	Decon	BWI

8. ACTIVITY LOG (CONTINUE ON REVERSE)

TIME	MAJOR EVENTS
0700	Notified of incoming patient.
0830	Decon area set up
0950	Decon personnel in suits and ready
1010	Aircraft arrived at treatment area
1025	Contaminated patient arrived at decon
1035	Last patient decon
1040	Operation notified that decon was secured

ICS 214

UNIT LOG	1. INCIDENT NAME NDMS Drill		2. DATE PREPARED 5/20/2006	3. TIME PREPARED 10:25
4. UNIT NAME/DESIGNATORS Transportion	5. UNIT LEADER (NAME AND POSITION) Donald Poore		6. OPERATIONAL PERIOD 0700-1900	

7. PERSONNEL ROSTER ASSIGNED

NAME	ICS POSITION	HOME BASE
Donald Poore	Transportion	BWI
Rence	Disposttion	MIEMSS

8. ACTIVITY LOG (CONTINUE ON REVERSE)

TIME	MAJOR EVENTS
0700	Notified of incoming patient.
0810	PM 44 on sence
0830	Lt Poore on the sence assuming transportion
0845	AA co PM −21 ALS
0850	Balt. Co PM −5 ALS
0915	Private Ambo Taylor Made BLS
0930	Grasonville Ambo BLS
1010	Aircraft arrived
1120	1 patient loaded on to Balt. Co 5 for St. Agnes
1155	2 patient loaded on to Balt. Co 5 for St. Agnes 1 Pro1 and 1 Pro 2
1156	2 patient loaded on to AA Co PM 21 for St Agnes 2 Pro 2

ICS 214

1. BRANCH Medical	2. DIVISION/GROUP Transportation		**ASSIGNMENT LIST**
3. INCIDENT NAME NDMS Drill		4. OPERATIONAL PERIOD – DATE/TIME 5/20/2006 0700-1900	

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF AMOS E. JOINER
DEPUTY CHIEF GARRY PACE
BRANCH DIRECTOR LISA CHERVON

DIVISION/GROUP SUPERVISOR DONALD POORE

AIR TACTICAL GROUP SUPERVISOR _____

6. RESOURCES ASSIGNED THIS PERIOD

TASK FORCE RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	TRANS. NEEDED	DROP OFF PT./TIME	PICK UP PT./TIME
PM 21	Keith Whalen	2			
Balt. Co 5	Diana Petrusik	2			1156
QA Co 201	Guy Schelhouse	2			1154
Taylor Made Ambo	Jocelyn Smith	2			1216
Waldorf Ambo	Dennis Welsh	4			1215
Walter Reed Bus		6			1220
					1245

7. CONTROL OPERATIONS

8. SPECIAL INSTRUCTIONS

9. DIVISION/GROUP COMMUNICATIONS SUMMARY

FUNCTION		FREQ.	SYSTEM	CHAN	FUNCTION		FREQ.	SYSTEM	CHAN
COMMAND	LOCAL				SUPPORT	LOCAL	TAC 2		
	RPT					RPT			
DIV/GROUP TACTICAL					GROUND TO AIR				

PREPARED BY (RESOURCES UNIT LDR.)	APPROVED BY (PLANNING SECTION CHIEF)	DATE	TIME

ICS 204

1. BRANCH Medical	2. DIVISION/GROUP Staging	ASSIGNMENT LIST

3. INCIDENT NAME NDMS Drill	4. OPERATIONAL PERIOD – DATE/TIME 5/20/2006 0700-1900

5. OPERATIONS PERSONNEL

OPERATIONS CHIEF AMOS E. JOINER
DEPUTY CHIEF GARRY PACE
BRANCH DIRECTOR LISA CHERVON

DIVISION/GROUP SUPERVISOR Linas Saurusaitis

AIR TACTICAL GROUP SUPERVISOR _____

6. RESOURCES ASSIGNED THIS PERIOD

TASK FORCE RESOURCE DESIGNATOR	LEADER	NUMBER PERSONS	TRANS. NEEDED	DROP OFF PT./TIME	PICK UP PT./TIME
PM 21	Keith Whalen	2			
Balt. Co 5	Diana Petrusik	2			
QA Co 201	Guy Schelhouse	3			
Taylor Made Ambo	Jocelyn Smith	2			
Waldorf Ambo	Dennis Welsh	3			
Balt. Co E 41	William Gardner	4			
Balt. Co 5	Davis Cox	4			
Balt. Co 263	Adam Davies	4			

7. CONTROL OPERATIONS Unit it staging until moved to treatment and transportion

8. SPECIAL INSTRUCTIONS

9. DIVISION/GROUP COMMUNICATIONS SUMMARY

FUNCTION		FREQ.	SYSTEM	CHAN	FUNCTION		FREQ.	SYSTEM	CHAN
COMMAND	LOCAL				SUPPORT	LOCAL	TAC 2		
	RPT					RPT			
DIV/GROUP TACTICAL					GROUND TO AIR				

PREPARED BY (RESOURCES UNIT LDR.)	APPROVED BY (PLANNING SECTION CHIEF)	DATE	TIME

ICS 204

8. RESOURCES SUMMARY

RESOURCES ORDERED	RESOURCES IDENTIFICATION	ETA	ON SCENE *	LOCATION/ASSIGNMNET
	AACO PM 21		0900	Transportation
	Balto. Co PM 5		0900	Transportation
	BWI PM 43		0900	Transportation
	WRMC Bus		0900	Transportation
	Waldorf Ambo		0900	Transportation
	Grasonville Ambo		0900	Transportation
	Private Ambo		0900	Transportation
	BWI Eng 43		0900	Litter Bearer
	Balto Co Eng 5		0900	Litter Bearer
	Balto Co Eng 41		0900	Litter Bearer
	Balto Co Eng 263		0900	Litter Bearer
	Tower 43		0900	Hazmat Decon
	BWI PM 43		0900	Standby
ICS 201 (12/93) NFES 1325	PAGE 4			

100

UNIT LOG	1. INCIDENT NAME	2. DATE PREPARED	3. TIME PREPARED
	NDMS Drill	5/20/2006	

4. UNIT NAME/DESIGNATORS	5. UNIT LEADER (NAME AND POSITION)	6. OPERATIONAL PERIOD
Staging	Linas Saurusaitis	0700-1900

7. PERSONNEL ROSTER ASSIGNED

NAME	ICS POSITION	HOME BASE
Linas Saurusaitis	Staging	BWI
Taylor Made Ambulance	BLS	2 Personnel
Grasonville Ambulance	BLS	3 Personnel
Waldorf Ambulance	BLS	3 Personnel
Balt.Co Medic 5	ALS	2 Personnel
AA Co Medic 21	ALS	2 Personnel
Balt. Co Engine 41	Engine Co	4 Personnel
Balt. Co Engine 5	Engine Co	4 Personnel
Balt. Co Engine 263	Engine Co	4 Personnel

8. ACTIVITY LOG (CONTINUE ON REVERSE)

TIME	MAJOR EVENTS
0700	Briefing at fire station
0730	Yellow and Green triage tent deployed
0800	Relocated to staging area Mathison way
0830	Mutual Aid unit completed roaster and information sheet
0900	Relocated unit to inter roadway
0915	Mutual Aid briefed by D. /C Warren
0925	Safety briefing by FF Brinkley
1015	Medical unit relocated to treatment area
1025	Escorted Walter Reed bus to Aircraft
1055	Escorted MEMA communication bus to transportation area
1115-1130	Assit with vehicle redeployment

ICS 214

Appendix 12
Publications Listed in Reportable Outcomes

1. Hu PF, Gagliano DM, Tang N, Truong LV, Markins L, Mackenzie CF. Mobile Wireless Video Transfer Systems (MWVTS) for Disaster Management. 2nd Annual Emergency Preparedness Conference, Washington D.C. Oct 2006.

Mobile Wireless Video Transfer System (MWVTS) for Disaster Management

Peter F. Hu, MS, CNE [1], David M. Gagliano, MBA [2], Nelson Tang, PhD [2], Lap V. Truong, MS [2], Larry Markins, MS [3], Colin F. Mackenzie, MD [1]

1 University of Maryland School of Medicine, Baltimore, MD
2 Northrop Grumman Corporation, Reston, VA
3 United States Army Medical Research & Materiel Command (USAMRMC) Telemedicine & Advanced Technology Research Center (TATRC)

Introduction: A major challenge for disaster management is real-time situational awareness. We tested MWVTS transmission of at scene videos through a wireless WAN to a remote EOC during a National Disaster Medical System Functional Exercise (NDMS-FX).

Methods: Live field video (close-ups and the focused field view) were captured by the MWVTS and transmitted through a secured multi-channel (3G-EV-DO, GPRS) wireless network to a server. Remote viewers at the EOC accessed the live or stored images through secured wireless tablet PCs. Six experts at the EOC (3-physicians, one-military, and two-EMS personnel) completed image evaluations on a 1-5 (worst to best) Likert Scale.

Results: A total of 22,419 real-time mobile video images (320*240) over 247.7 minutes were transferred (1.5 images per second) with average delay of 0.66 second. **Mobile video image** uses and scores (mean values) were: situational awareness of FX = 4.7, video images usefully for patient triage = 4.3, for Incident Commander = 4.0, in combination with FX radio communication = 4.7, for declaring a patient dead = 2.7

Conclusions: Video imagery from MWVTS improved EOC situational awareness. The images provided a useful training and debriefing record of FX. The institutional firewall configuration was a barrier for rapid system deployment.

2. Hu P, Truong L, Seebode S, Tang N. Fixed and Mobile Video for MASCAL reception and EOC awareness. 2nd Annual Emergency Preparedness Conference, Washington D.C. Oct 2006.

Fixed and Mobile Video for MASCAL reception and EOC awareness

BACKGROUND: New technology allows information gathering and collaboration across information networks that would be of benefit to emergency response. In a Homeland Security Exercise we evaluated the utility of fixed and mobile video on remote emergency operations center (EOC) situational awareness. The internet is ubiquitous and camera technology has improved performance, but increasingly there are obstacles and challenges in coordination across information technology networks. We evaluated the utility of multiple fixed and mobile video image displays in increasing situational awareness in EOC during a National Disaster Medical System (NDMS) Functional Exercise (FX) that tested activation of Mutual Aid agreements between the Army and Maryland Emergency Medical Services (MIEMSS) to access civilian hospital surge capacity beds for Mass Casualties (MASCAL).

METHODS: The Video Capture and Distribution System (VCDS) consisted of 16 video cameras connected with a digital video recorder (DVR) and a DVR viewer for real-time display of the 16 video images and a wireless relay station for the remote viewing station at the EOC. The VCDS-DVR could be configured at a rate of 1, 2, 4, 8, 15, 30 frames per second per video feed. The viewer providing from 1 to 16 images per screen was projected onto a 8 foot by 6 foot display in the EOC. Six experts (3 physicians, one military and 2 EMS personnel) completed image evaluations scoring them on a 1-5 (worst to best) Likhert Scale. During the FX the cameras were strategically focused on all aspects of the FX, including reception MASCAL, triage tents, staging and transportation. VCDS captured 16 images per second for all 16 video feed and display 4, 9 or 16 images at the remote EOC.

RESULTS: A total of 2 hours and 10 minutes of real-time video (130min*60sec per min*1image per channel*16videos=124800 images) were captured. End-to end delay was less than 4 second mainly due to the wireless transfer. **Mobile video image** uses and scores (mean values) were: Situational Awareness of FX = 4.7, MASCAL Triage = 4.3, For Incident Commander = 4.0, In combination with FX Radio Comm= 4.7, for declaring a MASCAL dead = 2.7 **Fixed video images:** Provided additional info= 4.0, combo of fixed and mobile best = 4.5, Click & Enlarge one of many image capability = 3.5, Increased situational awareness of FX = 4.5. **Challenges:** firewalls around EOC could not be opened because of administrative barriers, so wireless (slower) transmission was used.

CONCLUSIONS: Video imagery from mobile devices covering the entire FX site and from fixed locations improved EOC situational awareness. The developments in the FX could be tracked, the triage status of MASCAL could be immediately determined and the images provided a useful training and debriefing record of exactly what occurred. Imaging networks and technical support for EOCs and Incident Command Posts is needed to support both planned coordination of EOC image access from Emergency Response sites by various approved agencies and a mechanism to support this action where prior planning is not feasible or additional entities need access.

3. Hu P, Seebode S, Ho D, Mackenzie CF, Story T, Gilbert G, Handley C, Xiao Y. Rapid deployable Video Capture and Distribution System (VCDS) for real-time disaster management. American Telemedicine Association. In Press. Accepted for Publication 2007.

Rapid deployable Video Capture and Distribution System (VCDS) for real-time disaster management

Peter Hu, MS, CNE, Steve Seebode, Danny Ho, MS, Colin F. Mackenzie, MD, Tony Story Gary Gilbert, PhD, Christopher Handley, MS, Yan Xiao, PhD.

Introduction:
Effective real-time situation awareness and communication is critical in disaster response. We evaluated a real-time VCDS that delivered multi-channel live video wirelessly to a remote emergency operation center (EOC) during a National Disaster Medical System Functional Exercise (NDMS-FX).

Methods:
The 16-VCDS cameras were directed to provide maximal coverage of the reception, patient triage, staging and transportation areas. VCDS captures 16-video sites transmitting 16 images-per-second to the remote EOC. The viewer at EOC could select any combinations of 16 images based on the field situation. Six experts at the EOC (3-physicians, one-military and 2-EMS personnel) completed image evaluations on a 1-5 (worst to best) Likhert Scale.

RESULTS: A total of 130 minutes of video were captured and wirelessly reviewed in real-time. End-to-end delay was less than 4 second. **Video images:** Provided additional information = 4.0, Enlarge image helps the viewer = 3.5, Increased situational awareness of FX = 4.5.

CONCLUSIONS: Live video imagery from entire FX site greatly improved EOC situational awareness. The developments in the FX could be tracked, the triage status could be immediately determined. The institutional firewall configuration could be a barrier for rapid deployment.

4. Ho D, Hu P, Seebode S, Mackenzie CF, Brooks T, Handley C, Hirshon JM, Wasylina P, Johnson S. Real-Time Video Review: Data Collection Techniques to Support Situation Awareness. American Telemedicine Association. In Press. Accepted for Publication 2007.

Real-Time Video Review: Data Collection Techniques to Support Situation Awareness

Ho Danny
Hu Peter
Seebode Steve
Mackenzie Colin F, MD
Brooks Tim
Handley Chris
Hirshon Jon M, MD
LTC Wasylina P
Johnson S, MD

* Steve Johnson MD (Director of Critical Care Medicine at STC) Chris Handley -- NSC, Jon Mark Hirshon MD Dept Emergency Medicine UM & NSC, LTC Philip Wasylina Walter Reed Army Medical Center (WRAMC)

Introduction
Real-time field data is vital to situation awareness in mass casualty situations. Timely and reliable aggregate data is necessary for resource assessment and planning. We performed quantitative comparison of two real-time video review techniques for surgical activity assessment by a human operator. Video data from a National Disaster Medical System Functional Exercise (NDMS-FX) was used.

Methods
A two-factorial design was used. The first factor was review method: "freeze frame" (FF) versus "live-video" (LV). The second factor was task load: patient/non-patient count versus patient/non-patient count with simultaneous bed tracking (BT). Four 20-minute video segments were assigned via Latin-squares to four multi-disciplinary investigators. Study measures included patient/non-patient count accuracy and scores from the subjective mental effort questionnaire (SMEQ).

Results
Mental effort score differences were not statistically significant, although FF required slightly less mental effort. Both review methods produced similar average deviations in count accuracy, although FF afforded much less standard deviation (0.933 vs. 2.90). Data further indicated significant main effect of FF on patient count accuracy ($p = 0.037$) and non-patient count accuracy ($p = 0.001$).

Conclusions
Findings suggest the freeze frame review method may produce more reliable count accuracy while placing slightly less mental effort demand on the human operator.

Publications Listed in Reportable Outcomes

Tests of Between-Subjects Effects

Dependent Variable: ptdiff

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	PaLVial Eta Squared	Noncent. Parameter	Observed Power(a)
Corrected Model	1.338(b)	3	.446	1.926	.125	.018	5.778	.496
Intercept	1.512	1	1.512	6.534	.011	.020	6.534	.722
FF	1.013	1	1.013	4.374	.037	.014	4.374	.550
BT	.313	1	.313	1.350	.246	.004	1.350	.212
FF * BT	.013	1	.013	.054	.816	.000	.054	.056
Error	73.150	316	.231					
Total	76.000	320						
Corrected Total	74.487	319						

a Computed using alpha = .05
b R Squared = .018 (Adjusted R Squared = .009)

Tests of Between-Subjects Effects

Dependent Variable: nonptdiff

Source	Type III Sum of Squares	df	Mean Square	F	Sig.	PaLVial Eta Squared	Noncent. Parameter	Observed Power(a)
Corrected Model	81.850(b)	3	27.283	5.961	.001	.054	17.883	.956
Intercept	1.800	1	1.800	.393	.531	.001	.393	.096
FF	48.050	1	48.050	10.498	.001	.032	10.498	.898
BT	5.000	1	5.000	1.092	.297	.003	1.092	.181
FF * BT	28.800	1	28.800	6.292	.013	.020	6.292	.706
Error	1446.350	316	4.577					
Total	1530.000	320						
Corrected Total	1528.200	319						

a Computed using alpha = .05
b R Squared = .054 (Adjusted R Squared = .045)

Publications Listed in Reportable Outcomes

5. Mackenzie C, Hu P, Fausboll C, Nerlich M, Benner T, Gagliano D, Whitlock W, Lam D, Xiao Y. Challenges to Remote Emergency Decision-Making for Disasters or Homeland Security. Cognition, Technology & Work. In Press. Accepted for Publication 2007.

See Following Page.

Challenges to Remote Emergency Decision-Making for Disasters or Homeland Security

Colin Mackenzie
University of Maryland, Baltimore, MD

Peter Fu-Ming Hu
University of Maryland, Baltimore, MD

Carsten Fausboll
NATO, Brussels, Belgium

Michael Nerlich
University of Regensburg, Germany

Thomas Benner
University of Regensburg, Germany

David Gagliano
Northrop Grumman Corporation, Reston, VA

Warren Whitlock
Fort Gordon, GA

David Lam
University of Maryland, Baltimore, MD and
United States Army, Telemedicine and Advanced Technology
Research Center, Fort Detrick, MD

Yan Xiao
University of Maryland, Baltimore, MD

Abstract

New technology allows information gathering and collaboration across information networks that would be of benefit to emergency response. In a Homeland Security Exercise we compared the utility of fixed and mobile video and high quality still images on remote expert decision-making. Sixteen experts situated in 3 countries viewed and seven evaluated events of the exercise assisted by audio commentary of local knowledge experts. They evaluated the usefulness of black and white (B/W) compared to color images, fixed fast video versus slow video and still images. Technical difficulties interrupted image transmission to one remote site for half the Exercise. However, the images were found useful, color more so than B/W, mobile more so than fixed. The combination of still images and video was best. Playback of recorded images was especially useful for remote evaluation and decision-making. Improved reliability for these imaging technologies could improve shared awareness and large scale coordination for Homeland Security events.

Corresponding author:
Colin Mackenzie, MD
701 W. Pratt Street, 5th Floor
Baltimore, MD 21201
phone: 410-328-8673
fax: 410-328-2841
E-mail: cmack003@umaryland.edu

Challenges to Remote Emergency Decision-Making for Disasters or Homeland Security

INTRODUCTION

Computer supported cooperative work (CSCW) technologies offer a range of methods to enable teams to communicate, share work spaces, exchange ideas, plan, calibrate their situation assessment and work in parallel with great efficiency (Olson et al 1999). In the context of large scale collaboration, especially when tasks are driven by external events, the strengths and limitations of such CSCW technologies are incompletely understood and this lack of understanding will impact both their future uses and the expectations from implementation. Potentially the ability for remote experts to share relevant parts of their expertise "just-in-time" or for remote experts to provide on-site decision-makers with suggestions to build on ideas or courses of action is attractive. For Emergency Management Responders planning for rare scenarios, such use of real or virtual expert input could allow significant reductions in time to build, review, revise and re-review those plans. Furthermore, real-time responses for such Emergency Management Responders may benefit from both on-site and remote experts to suspect and confirm the presence of confusing factors or uncertainties dynamically as the scenario unfolds, so that situational assessment can be shared and jointly developed. The technology to facilitate such remote collaboration among distributed members includes, voice, data and images, both video and still. The internet has facilitated inexpensive communications of these media and the computers, recorders and cameras have recently become less expensive, more robust and refined. The technology now has improved performance (e.g., mobile and portable communication). However, there are trade-offs in quality and frequency of image transmission that could impact the decision making and situational awareness among distributed collaborators (Wootton et al. 1997; Chapanis et al. 1972; Xiao et al. 1999). There are also challenges for expert decision-making when Emergency Management or Disaster Response recommendations need to be coordinated dynamically with on-site responders from a geographically foreign location.

Disaster response for natural or man-made emergencies requires disparate expertise from multiple widespread forms (e.g., personnel, resources, databases). On-site responders can benefit from remotely situated experts who share the key aspects of their expertise at the point in the proceedings that these aspects are relevant. Such distributed decision-making can provide time-critical information that may be life-saving or protect rescuers or victims from exposure to hazards, and can prevent fixations or failures to consider earlier discarded hypotheses. The remote experts can function almost like a "transactive" memory for the on-site Emergency Management Responders who may be too busy with multiple tasks and rapidly changing events to be able to access databases or to accurately recall past information or communications (Wegner et al 1991, Xiao et al 2002). This study proposed to address several of the limitations from prior studies by including: real-time local knowledge audio supplements from on-site, a team of remote emergency management experts to counteract the varying background and expertise of individual remote experts, training pre-event to enhance coordination, the same low bandwidth black and white video enhanced with high bandwidth color video and still images

transmitted to all facilities to minimize diagnostic biases and differences in decision-making from different remote locations.

We examined evidence to support three hypotheses of relevance to Homeland Security or Disaster Response during an exercise at the University of Maryland, Baltimore Campus: 1) Remote experts can identify real-time emergency events by viewing mobile, slow color video (1-2 frames/sec. (fps)) and the currently used fixed black and white (B/W) public safety video surveillance camera (20fps) images of events; 2) High quality still images sent to remote experts convey details not recognized in video; 3) Still color images promote situational awareness in geographically foreign locations.

We also assessed obstacles and challenges in coordination across organizational boundaries and routine information technology networks using subjective utility judged by remote experts. The Homeland Security exercise had the objective to improve emergency response coordination and called for responses from a collection of organizations (North Atlantic Treaty Organization (NATO) civil defense, European and United States (US.) Emergency Management Responders, Police, Physicians, University Public Safety personnel and both State and Federal Agencies), who under normal circumstances, did not work together. We expect that such modes of collaboration would be prevalent in responses to world-wide disasters and other high consequence events.

METHODS

The University of Maryland (UM) Homeland Security Exercise was viewed and evaluated remotely by experts in Emergency Operation Centers (EOC) in Regensburg, Germany, Brussels, Belgium and Baltimore, US. These EOC were connected with three Integrated Digital Services Network (ISDN) lines routed through Fort Gordon, Georgia, US. One ISDN line each to UM, UR, and NATO with two Cameras C1 , the Public Safety surveillance B & W camera and C2, a mobile wireless camera. A secure web server and video-cassette recorder (VCR) allowed duplex video-teleconference (VTC) communications and recording of the ISDN connections. Locations (L) in UM, UR, and NATO for video communication of the Exercise through three real-time video Integrated Digital Services Networks (ISDN) are shown in Fig 1.
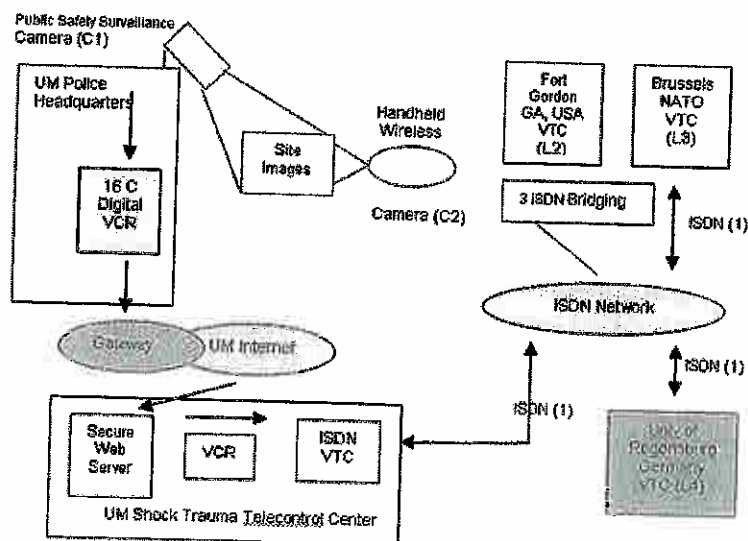
[Insert Figure 1 here]

Exercise Scenario: A "Dirty Bomb "(a real radiation source in a black briefcase) activated radiation sensors in a kiosk on the UM Campus outside the hospital (Fig 2. shows the kiosk with the briefcase). The sensors automatically dialed a telephone alert to the Environmental Health and Safety Offices, which sent a team to examine the alarming sensor and both confirmed radiation and activated the emergency response process. The bomber contacted a local television station to tell them about both the Dirty Bomb and a second conventional bomb set to explode in 45 min in the Emergency Medical Services (EMS) headquarters building. The exercise involved 7 Local (UM and City), 7 State and 7 Federal agencies (Fig 3. *Panels show*

[Insert Figures 2 and 3 here]
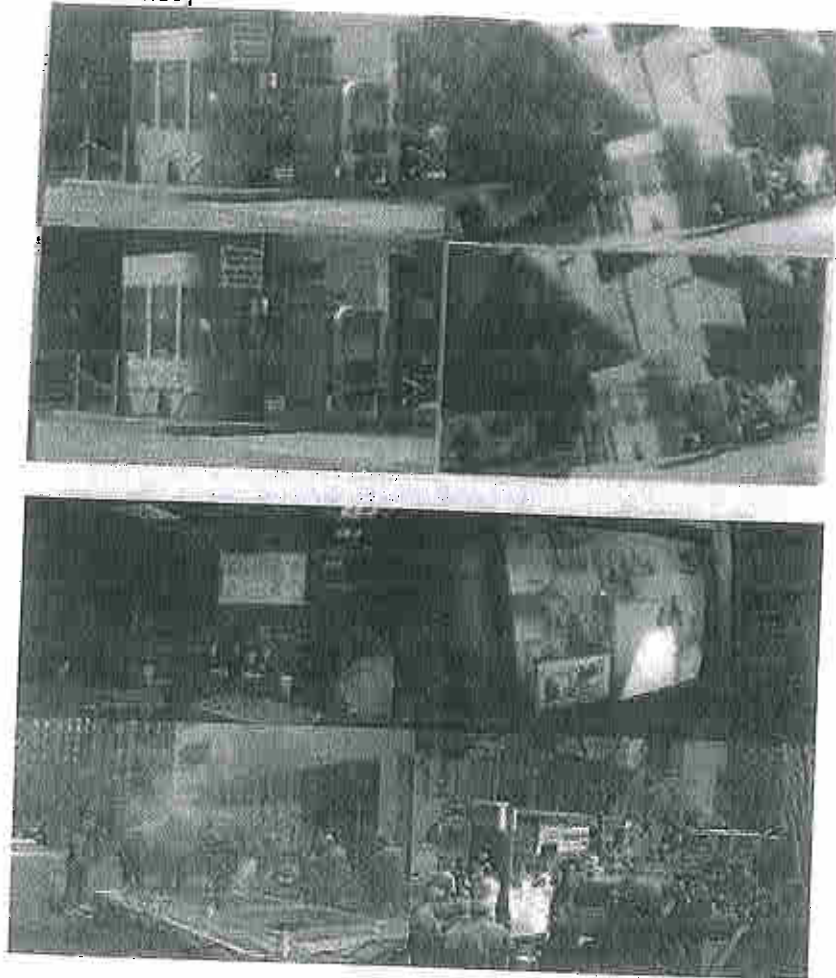
from Top left, proceeding clockwise a) EOC at UM, showing display of B/W image from surveillance camera and color images from slow mobile video, b) EOC in Regensburg, Germany in real-time video conference with on-site experts during the exercise, c)Baltimore City Fire Department Response, d) Decontamination). Remote Expert Emergency Management Responders were situated at University of Regensburg, Germany (UR, n=9) and NATO headquarters (Civil Emergency Planning Directorate), Brussels, Belgium (NATO, n=3) and UM Emergency Operation Center (EOC) (n=4). Testing of the ISDN connections occurred between

UM–UR and UM-NATO through Fort Gordon in the week before the Exercise. However the UM-Fort Gordon-NATO-UR 4-way link could not be tested due to scheduling conflicts. The general purpose (but not details of the simulated event) of the Homeland Security Exercise was distributed by e-mail to all participants in the EOC's 2 days before the exercise. During the actual live video transmission of exercise activities, background audio information (only when requested) was provided and questions were answered by two on-site (UM) experts who were viewing the same images as were transmitted to the EOC's. Evaluations were completed or partially completed by 7 (3 at UR and UM, 1 at NATO) of the 16 remote EOC experts. Images for remote EOC evaluation included a) mobile slow color video taken from a lapel mounted camera carried by study participant who followed events on foot (Fig 4 mobile imaging system

[Insert Figure 4 here]

covered both bomb sites, worked well inside buildings/elevators, etc.), b) B/W surveillance camera images from a fixed location, providing a view of where the "Dirty Bomb" was planted and the radiation sensors were triggered. Evaluation forms (Table 1) were completed serially at specific times (shown at end of Table 1) identified on the Master Event Synchronization List (MESL) for the exercise. Still, high quality (3.0 Megapixels) images of the Exercise taken with a digital camera by a second study participant were evaluated.

Table 1: Remote Observation LAD Demo, March 26, 2004

Answer Sheet Number: 1, 2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12

Time Completed: _____ hours _____ minutes

I am: (Check) ☐Medical ☐Police ☐Fire Department ☐Military
☐Civil Defense ☐Other

1. I would predict this event will be physically affecting a population of

Circle: <5   6-10   11-30   34-100   101-500   >500

2. List the most recent decisions made by those seen on the images displayed. (List up to three most important decisions, in order of decreasing importance.)

3. At the moment, the following is unclear to me (List up to three most important, specific areas in the order of decreasing important.):

4. How I would describe the Emergency Team Activities. (List up to three most important, descriptors, in order of decreasing important.):

5. I anticipate the following immediate problems (List up to three most important, specific problems, in order of decreasing important.):

6. List in priority the three current most important objectives of the Emergency Management Team. List your instructions to achieve objectives.

7. List in priority three most important pieces of information you would like to obtain and why.

8. Circle your response to the following statements:

	Disagree				Agree
I am comfortable giving instructions to the team	1	2	3	4	5
Given the opportunity, I would obtain more information	1	2	3	4	5
I know the tasks being carried out by the team	1	2	3	4	5

9. Circle your probability estimate of a major clean-up.

10. Other comments.

Lowest				Highest
1	2	3	4	5

Points where answer sheets 1-12 to be completed.
1) Radiation sensor alarms
2) Video surveillance camera review
3) Significant source of radiation in abandoned briefcase found
4) 911 called
5) Police securing 300-foot perimeter
6) Mini disaster ED & STC fly-by
7) Evacuate v. shelter in place
8) News media conveys 2 bomb messages
9) Knowledge that MIEMSS bomb set to explode 11:45 am
10) MIEMSS evacuation
11) Syscon relocates
12) Order to set up decon facility
13) Bomb squad defuses dirty bomb

Table 2: Comparison of Still Images with Live Slow Video Transmissions

I. The images (like those shown in the LAD Demo) would be useful for:

Please circle the appropriate number 1-5 (where 1= Strongly Disagrees, 5= Strongly Agrees) for your response to the questions below.

1. Disasters where a knowledgeable person provided audio commentary.

114

2. Incident Commander for Emergency Response coordination in Terrorist threat agent release in local area.

3. Trauma patient extrication guidance to pre-hospital personnel.

4. The surveillance camera (B&W) video was useful.
5. The mobile slow video image review capability was best.

II. The <u>still</u> images of the LAD Demo (http://nsc.umary land.edu):

1. Provide me with additional information not noted during slow video.

2. Clarity of the still images increased my understanding of slow video events.
3. The combination of still images and slow video would be best.
4. The size of the thumb-nail images on the website is ok.

5. I would prefer all the images to be larger.

6. I would like to be able to click on and enlarge selected images.
7. Images in color conveyed more than black and white (B&W).

Table 3: Evaluation Question Kit
Please circle the number that corresponds to your agreement to the following statements.
(1= Strongly Disagree, 5= Strongly Agree)

	1 Strongly disagree	2 Disagree	3 Don't agree or disagree	4 Agree	5 Strongly Agree	no answer
			number of answers			
1. I was able to make decisions based on remote visual information that were not possible using verbal information alone			2	2	3	
2. I was better informed because of remote visual information.			2	4	1	
3. The remote visual information changed my decision making			2	3	2	
4. The remote visual information increased the confidence I have in my decisions			1	3	2	1
5. In comparison with that of those physically present at the scene, I was able to gather the same information that they did.	2	2	3			
6. The remote visual information provides me with useful additional information.			1	3	3	
7. I was as informed as those physically present at the scene.	2	1	3	1		
8. Access to remote visual information greatly improved my ability in						
a. Preparation	1		2	2	1	1

Statement						
b. Guiding field emergency procedures		1		3		3
c. Coordination				3	1	3
9. The views provided met my needs.	1	2		4		
10. The transmission of the video images poses intrusion to terrorist victims' privacy.	3	2			2	
11. The transmission of the video images of EMS activities poses an intrusion in my privacy.	3	2	1		1	
12. I am uncomfortable having my performance available to an off-site observer.		4		3		
13. Operation of a telemedicine system distracts the crew's attention to such a degree that the safety is compromised.	1	2	4			
14. Operation of a telemedicine system delays regular essential steps in emergency/disaster management.	1	3	1	1	1	
15. The terrorist victim would feel comfortable with the presence of a telemedicine system.		2	3	1	1	
16. Acquiring and transmitting video images lengthens the emergency management time.		1	3	1	2	
17. Using a telemedicine system poses an additional workload on the emergency care providers.			2	4	1	
18. Transmissions of the video images provide remote decision makers information that is otherwise impossible for me to convey yet critical for their decision making.		1		3	3	
19. Availability of video images to off-site observers would enable me to communicate better and easier.			1	6		

Data Collection: Table 1: 10 statement evaluation completed serially, in real-time, during the exercise identifying decisions made, uncertainty, activities occurring, problems identified, priorities, information needed, outcomes and comments; Table 2: 20 question form completed one month after the participants had viewed video images and made remote assessments of the Homeland Security Exercise. Table 3: the exercise Evaluation Questionnaire Kit included 19 statements in relation to the telecommunications, completed at the end of the exercise, on use of video in decision-making and use of images for remote EOC; Table 4: Post-evaluation questions including strengths, weaknesses, opportunities, threats (SWOT) analysis revealed by the exercise. All statements were scored on a Likert scale of 1=strongly disagree to 5=strongly agree. Qualitative data were requested by including free comments sections.

RESULTS

Technical and Interoperability Issues: Transmission gaps occurred due to the service provider's interoperability problems that interrupted image transmission to NATO for 1.5 hours of the 3 hour Exercise. In addition during attempted simultaneous connection to NATO and UR, audio linked with the ISDN was lost, and a land-line connection was required to maintain audio communication with UR.

Remote Decision-Making (Table 1): UR and NATO identified *on-site decisions* including detection and recognition of "Dirty Bomb", bomb location, EMS building evacuation, bomb squad defusing, *emergency team activities*, evacuation, shielding, readiness for casualties, Incident Command (IC) set-up. *Unclear issues* were why the hospital was not evacuated. *Problems* were noted in the limited perimeter cordoned off around the bomb and the proximity of the IC Post to the bomb site (both the lack of hospital evacuation and exercise perimeter were limitations intended to minimize the impact on the hospital clinical operations). These results support the hypothesis 1 that remote experts can identify real-time emergency events.

Evaluation of still image and video usefulness (Table 2): Mean scores for Disaster Management 4.7; incident commander 3.8; trauma patient extrication 4.3; slow color video better than fixed B/W video 4.2; still images identified information missed on video 4.7; clarity of still images increased understanding of video events 4.4; combination of video and still images best 4.8. The latter four scores support hypotheses 2 and 3, that high quality color images promote situational awareness and convey details not recognized in video. Image size: 6 x 5cm images compared to 23 x 29cm, small images OK 4.8; larger image necessary 1.4. While the larger bandwidth of color video scored highly over B & W video, a still high quality color image of low bandwidth appeared useful for remote decision-makers to provide context for their questions and clarify uncertainties (e.g. see Fig 2, still 3.0 megapixel image (upper left Panel) and frame from slow video image (upper right Panel) of the radiation source in the black briefcase, alongside the kiosk housing the radiation sensor; Lower left and right Panels – the same images in B & W).

Value of Video for Decision making and Situational Awareness (Table 3). Image Comparison: Technical issues included: B/W images from public safety surveillance cameras were inadequate as their field of view was degraded by sunlight/darkness and limited by being at a fixed location. The mobile imaging platform was able to record details of *both* bombs and gave greater and more flexible incident coverage, less affected by changing lighting conditions.

Specific Issues: The following organizational issues were recognized: potential for international and wide area distribution links for command and control; different culture and tactics for emergency response; significant language barriers. It was noted that insider knowledge from on-site commentary and local background material and overview maps are essential for remote decision-maker understanding.

Post Evaluation Comments and Answers: The results shown in Table 4 can be summarized as indicating that the remote experts saw the importance of coordination of UM with outside agencies and were able to appreciate how rapidly events changed, the need for a communication strategy, crowd control and an integrated emergency response. Highlights of the SWOT analysis shown in Table 5 included: benefit of duplex audio communication with field mobile camera; need for communication with an on-site Command and Control; remote control of fixed camera; helicopter (aerial) overview image would be helpful; infra-red camera capability would be needed for night use; commentary from different domain experts would be useful (e.g. police, fire, EMS, medical). Translation into native language (this occurred briefly to UR)

improved understanding of emergency events and generated multiple questions from other members of the remote EOC in UR in comparison to those who had asked the earlier questions. Remote control/zoom/tilt/pan of cameras would be useful. It was difficult to distinguish between exercise responders and observer/evaluators. Problems in data and workflow in international collaboration were shown, but it is important to share information about different strategies and response tactics. Telecommunications are needed and must be improved.

Table 4: Post Evaluation of Remote Observation LAD Demonstration Exercise

Please circle the appropriate number 1-5 for your response to the questions below.

	1 Strongly disagree	2 Disagree	3 Don't agree or disagree	4 Agree	5 Strongly Agree	no answer
	number of answers					
1. The Demonstration seen by Telemedicine was realistic.			4	3		
2. The Exercise helped me prepare for a similar real event.	2		1	3	1	
3. The Campus/City emergency coordination was increased by the Exercise.			2	4		1
4. For me, the Exercise revealed the following about the Emergency Management Plan (EMP)						
a. Increase my knowledge of the University of Maryland (UM) Campus EMP				5	1	1
b. Ease of Inter-Campus Communications			2	4		1
c. Importance of coordination of Campus EMP with outside agencies.				5	1	1
d. Need for early involvement of City in Campus EMP.			1	4		2
e. Confidence in my decision about how to manage a similar scenario.		1	2	3	1	
f. Identified how I can help the UM Campus EMP			3	4		

g. Improved my understanding of how events change rapidly.					5	2	
h. Showed me the need for media communication strategy.					5	2	
i. Revealed a requirement for a single spokesperson.				1	2	3	1
j. Importance of control of the "Walking Worried"				2	2	3	
k. Showed an integrated response between Campus /City /State Emergency Responders					2	3	2
l. Maximum use of Campus Resources		1	1	4			1

List strengths, weaknesses, opportunities and threats (3 each) of using Telemedicine for the Emergency Response Demonstration Exercise:

Table 5   Remote Observation LAD Exercise

Post Evaluation Strengths, Weaknesses, Opportunities and Threats Analysis of Remote Observation LAD Exercise

List 3 strengths of using telemedicine for the Demonstration Exercise:

1. Images / Video combined with audio / text makes understanding of incident much better
2. Different tactics of rescue people on site vs. our tactics (e.g. missing marked barriers of Hot Zone)
3. Knowledge of such an event increases
4. See the difference between your and our procedure
5. Evaluate from around the world
6. Able to get some real time photos
7. Better understanding
8. Visual cues to response patterns
9. Increase participation and thereby information sharing
10. Transmission out of areas which are blocked for rescue workers
11. Supplement to spoken situation reports

List 3 weaknesses of using telemedicine for the Demonstration exercise:

1. There should be changing speakers depending on the specialty (Police, Fire Dept. EMS etc.), also information from Incident Commander / On-site Commander necessary
2. Live images are meaningful, recorded images important for review
3. Broadcast wasn't very good
4. Improve picture quality
5. Technical difficulties
6. Unclear pictures
7. Cannot cover the whole incident area
8. No communication with sector commanders

What opportunities did you see for an improved use of telemedicine in emergency response?
1. Real-time interpreter should be involved to make real-time decisions.
2. Papers about the exercise/incident should be in German because the basic "school English" is long ago
3. We need improved techniques and before the happening a better "programme" and a better description of who is taking part in
4. Picture quality
5. Evaluation from around the world
6. Distribute information to a wider audience to include city / state / county EMS / systems
7. Depending on size of incident increased number of transmission capabilities

What threats did you see to using telemedicine to coordinate emergency response?
1. Audio/Video transmission can provide facts about an incident which is geographically limited; but with 2 incident sites the images are no more that up-to-date to provide real-time decisions
2. "I don't think that there are huge risks"
3. All disasters / catastrophes
4. Policy "On-site Command" cannot be replaced by telemedicine
5. Telemedicine depends on weather and light (night). Preparation time for telemedicine not known.

DISCUSSION

The need to provide remote and just-in-time expertise is ubiquitous in many domains, but in Emergency Management Response it could save many lives. Following the Sarin attack in the Tokyo subway in 1996, emergency responders initially believed a bomb had exploded (Okumura et al 1998), but an emergency physician seeing the news video clips of choking and tearing victims made the clinical diagnosis remotely and called Tokyo authorities. The issue of how information gathering from multimedia is impacted by bandwidth was a question addressed by the design of the Homeland Security Exercise reported here. However, the full answer to such a question was not obtained, due to many limitations including the small sample size of remote experts completing evaluations, the communication breakdown with NATO, the hindsight bias in completing the evaluation of the still image usefulness after the end of the exercise and the incomplete answers to some evaluation questions that could not be filled in because the dynamic events of the exercise prevented such timely actions by evaluators. The findings although not immune to such biases and technical limitations do appear have a face validity in representing what strengths and limitations might be present in deciding bandwidth requirements in a real Emergency Management Response situation, in which remote experts were part of the distributed response team. Where bandwidth needs to be conserved, 6 x 5 cm still 3.0 megapixel color images appear to have merit in conveying information and allowing remote experts to see details not appreciated in video. Mobile slow (1-2 fps) color video has less bandwidth and more flexibility in coverage over fixed location 20 fps B & W video. New information technologies provide the impetus to explore alternative operating procedures and command structures (Rasmussen, et al 1991), especially when chemical, biologic or radiation threats can make physical presence hazardous.

Several important conclusions can be drawn from this preliminary study examining technology impact on remote decision- making in emergencies, all of which support our original hypotheses.

1) Intermittent high quality still images can augment understanding and information extraction from slow low bandwidth color and fast B/W video for remote EOC. For example, in

120

Fig 2 the red motorbike is easily recognized in the still image and could be used as a reference point for the remote decision makers to provide the context of their comments. In the B/W images the motorbike is difficult to distinguish from the background, and in a frame from the low bandwidth (and low quality) color video image (right panel Fig 2) it is difficult to be certain that the red object is a motorbike. In many circumstances public safety surveillance cameras may have dual use as shown in this demonstration. Including such existing infrastructure into emergency management response could be a cost effective way to monitor potential targets of terrorist activities. It is concluded that color not B & W cameras, whose field of view and contrast can be remotely controlled in varying light conditions, should be used.

2) The increased number of questions from a greater number of the remote audience at UR when German was spoken, suggests that the conveyance by on-site experts of local knowledge and clarification of remote decision-making interpretation is increased by use of native language of the remote experts.

3) Face-to-face meetings with UR, but not NATO, which occurred before the exercise improved collaboration and communications during the exercise. The prior socialization resulted in higher quality, more complete and greater number of free comments completed in the evaluations received from UR. However, there were significant technological problems with the connection to NATO and the NATO experts were clearly frustrated by the long duration gap in communication which left them unable to follow many of the events of the Exercise.

4) One feature that salvaged the lack of information during the NATO communication break was the ability to play-back the previously recorded images from the mobile slow video acquisition. This playback had significant application in allowing the 3 members of the NATO EOC to develop awareness of what had transpired during the time interval when communications were interrupted. In addition the playback allowed all remote observers to identify events surrounding the "Dirty Bomber" planting a real radioactive source that triggered a radiation sensor. The timing of the triggered alarm was precisely known and time-coded video data enabled this video segment to be precisely located and reviewed.

5) Local domain expertise and duplex communication with the incident commander would improve remote expert decision-making. In dangerous environments (chemical, biologic, radiation, explosive) remote monitoring with video could be very helpful to safe entry and activities of EMS personnel and in coordination of the emergency management plan and health care facility readiness. Interfaces with sensors (e.g., the robot radiation detector and analyzer used in this exercise) would allow remote experts to interpret the sensor data in real-time, so expediting the appropriate emergency response.

There is a future potential, when reliability is improved, for the imaging technologies to improve shared awareness and remote distributed team collaboration. Mobile wireless color images with duplex audio and interfaces with peripheral devices used in the field would enhance the coordination of expert decision-makers as part of a distributed team. Embedded technology in the video camera (e.g., Global Positioning System with coordinates linked to Google world display) would allow mapping and other situational awareness artifacts to facilitate remote decision- making. The findings from this preliminary study have profound implications for the development and design of information and communication technologies necessary for large scale collaboration for local and international disasters and emergency response.

REFERENCES

Chapanis, A., Ochsman, R. B., Parrish, R. N., & Weeks, G. D. (1972). Studies in Interactive Communication: I. The Effects of Four Communication Modes on the Behavior of Teams During Cooperative Problem-Solving. *Human Factors, 14,* 487-509.

Okumura, T., Suzuki K, Fukuda A., Kohama, A., Takasu, N., Ishimatsu,S., Hinohara, S. (1998)The Tokyo subway sarin attack: disaster management,part 2 : hospital response. *Academic Emergency Medicine 5,* 618-624

Olson,J.S., Olson,GM (1999) Compurt supported cooperative work. In F.T. Durso (Ed) Handbook of applied cognition (pp 409-442). Chichester, England: Wiley.

Rasmussen, J., Brehmer, B., & Leplat, J. (1991). *Distributed Decision Making: Cognitive Models for Cooperative Work.* Chichester: Wiley.

Wegner ,D.M., Erber, R ., Raymond, P .(1991). Transactive memory in close relationships. *Journal Personality and Social Psychology 61,* 923-929

Wootton, R., Dornan, J., Fisk, N. M., Harper, A., Barry-Kinsella, C., Kyle, P. et al. (1997). The effect of transmission bandwidth on diagnostic accuracy in remote fetal ultrasound scanning. *J.Telemed.Telecare. 3,* 209-214.

Xiao, Y., Mackenzie, C. F., Orasanu, J., & Group, L.(1999). Information Acquisition from Audio-Video-Data Sources: An Experimental Study on Remote Diagnosis. *Telemedicine Journal, 5,* 139-155.

Xiao, Y., Moss, J., Mackenzie, C .F., Seagull, F.J., Faraj, S. (202) . Transactive responsibility systems and high reliability teams: A tentative formulation. *Proceedings Human Factors and Ergonomic Society , 46th Annual Meeting* pp 1428-1432

Mackenzie, et. al.

Legends Figures 1-4

Figure 1: Connections with Emergency Operations Centers during exercise.

Figure 2: Comparison of bandwidth effects of video and still imagery.

Figure 3: Images from Exercise show field and telecommunication events.

Figure 4: Mobile wireless imaging system.

Appendix 13

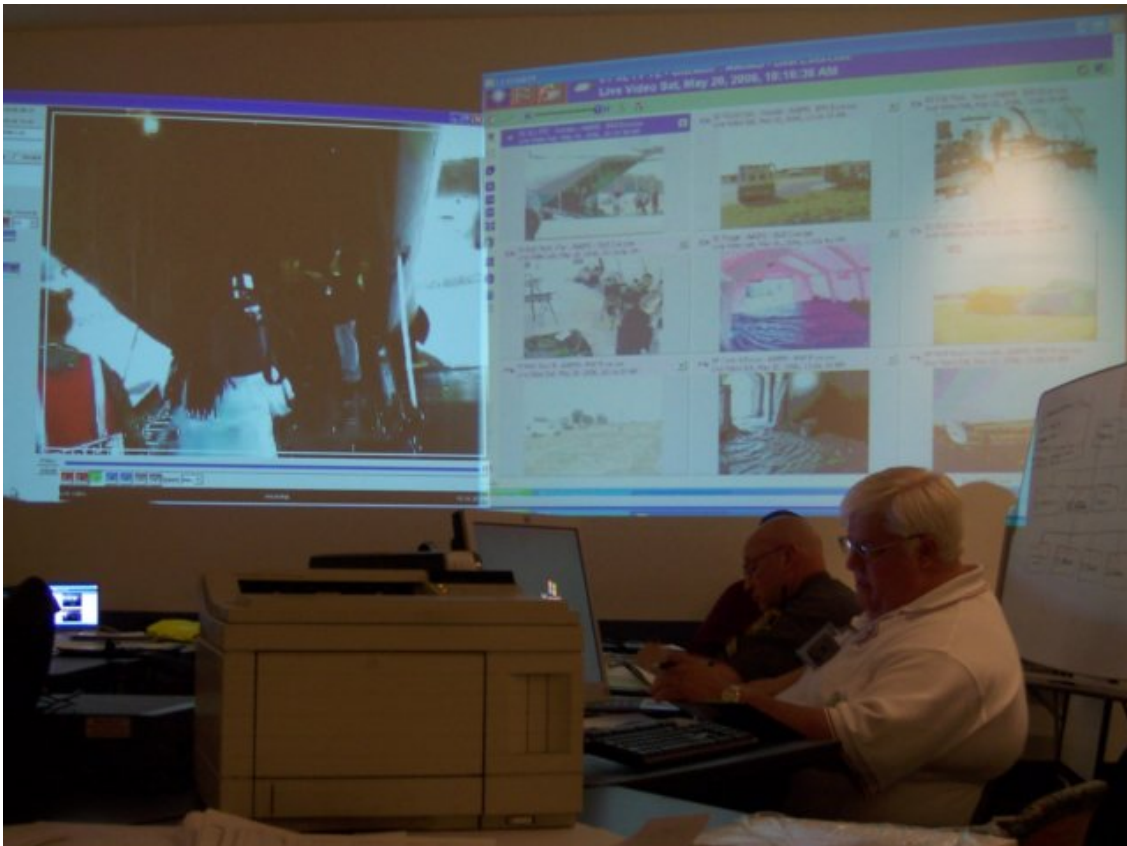## Supporting Data—AAIMS Exercise Photos

Functional Exercise (FX)

Aerial view of FX set-up

EOC

Fixed video camera blow-ups projected onto EOC wall during FX

Displays in real-time of mobile images (left screen) and 9 cameras simultaneously displayed (right screen)

EOC showing 4 video cameras (right screen) and full screen mobile video camera (left screen)

EOC during FX (from left to right: P.I., Fire Chief (seated), Director BWI Administration, BWI Fire and Rescue)

Staging at FX

BWI Fire and Rescue trucks on standby for FX

Communications satellite (TATRC supported) and ambulance staging area for FX

Arrival of MDNG C-130 with MASCAL at BWI

MASCAL for DECON separated on deplaning

Methods of MASCAL Transport

Military large-wheeled stretcher for MASCAL

Civilian small-wheeled stretcher moving MASCAL

Four stretcher bearers with MASCAL

WRAMC Military stretcher bus

One MASCAL military dog at BWI

Triage

Civilian triage 'Red' Tent

Civilian priority 2 'Yellow' Tent

'Yellow' Tent priority 2 MASCAL

Testing remote MASCAL triage
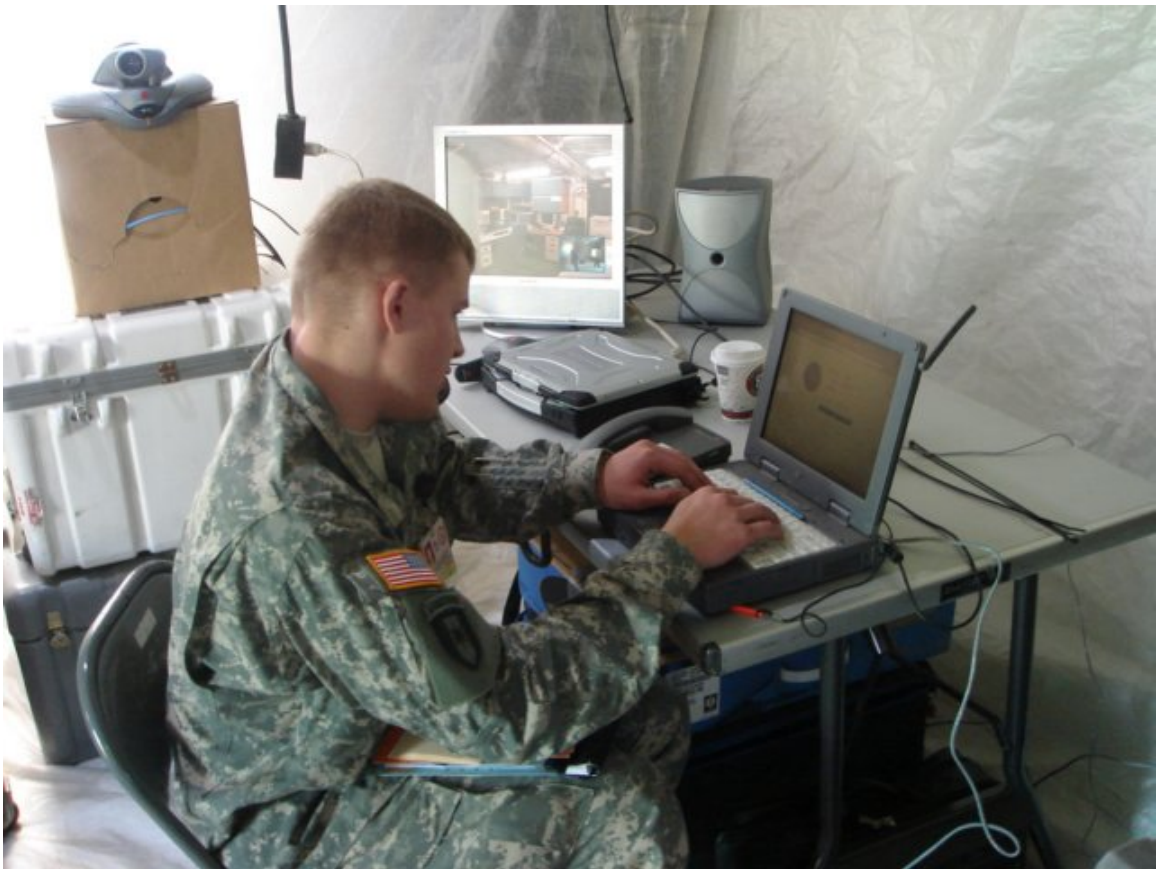
FDDMTF Activity

FDDMTF during FX

FDDMTF during FX

Communications

BWI Fire Department Communications

WRAMC/NDMS/TATRC Military COM

Video Cameras—Mobile/Fixed

Mobile camera (on cap of man in bottom right of photo)

Mobile video camera system

FDDMTF civilian/military providers and mobile video images

Fixed cameras set up for FX

Deteriorating Patients

Rapid evacuation of deteriorating MASCAL to MSPAC helicopter

Evacuation of deteriorating MASCAL by MSPAC medivac to NDMS hospital

Hospital Transport

Staging and transportation to NDMS hospitals

Post FX

"Hot wash" debrief at BWI EOC

"Hot wash" debrief at BWI EOC

"Hot wash" debrief at BWI EOC

"Hot wash" debrief at BWI EOC